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STATEMENT OF WORK

1. DESIGN OBJECTIVES.

1.a. General Requirements. The design and technical criteria contained or referenced in this Request For Proposal (RFP) constitute the minimum requirements (unless otherwise specified) of the Government for the subject project, hereinafter referred to as “the FY01 project”. The FY01 project shall be designed and constructed to be architecturally compatible with the family housing at Schofield Barracks that has been recently constructed or is under construction. The following are recent or on-going family housing projects.

FISCAL YEAR	PROJECT NUMBER	HOUSING AREA	STATUS
FY94	FHNC PN 37122	Helemano Reservation	Completed
FY94	FHNC PN 34872	Housing Area V	Completed
FY95	FHNC PN 39028	Housing Areas U & V	Completed
FY97	FHNC PN 42458	Housing Areas U & V	Completed
FY98	FHNC PN 39037	Housing Area U	Completed
FY99	FHNC PN 47296	Housing Areas I & J	Under Construction

1.b. Objectives. This solicitation seeks to obtain family housing that is complete and adequate for assignment as quarters for military personnel and their families. Work under this project consists of :

1.b.(1) Design and construct of a total of 70 family housing units on Government-owned land in Areas “J” and “U” at Schofield Barracks Oahu, in compliance with the provisions of this RFP.

1.b.(1).a. Housing units. Family housing units with patio, garage, exterior storage, and including the following Contractor-furnished/Contractor-installed (CF/CI) equipment and appliances: range, refrigerator, garbage disposer, dishwasher, water heater, clothes washer and dryer and smoke detectors. Family housing units shall be a mix of three and four, bedroom family housing units as shown in Table 1-1:

TABLE 1-1 - FAMILY HOUSING UNITS				
Pay Grade	Number of Bedrooms	Number of Units	Accessible Units	Total Units
O-1 through O-3 (CGO)	4	27	2	29
E1 through E6 (JNCO)	4	19	1	20
E1 through E6 (JNCO)	3	20	1	21
TOTAL UNITS		66	4	70

1.b.(1).b. Special requirements, as detailed in the Scope of Work.

1.b.(2) Accessible units. No less than two (2) CGO four-bedroom, one (1) JNCO four-bedroom and one (1) three-bedroom units shall be single-story ground floor units. These units shall be designed and built in such a way that they may be easily and readily modified to accommodate physically disabled occupants at time of occupancy. See paragraph 5.a.(2)(a). Design of accessible units shall conform to Uniform Federal Accessibility Standards (UFAS) and to American with Disabilities Act Accessibility Guidelines (ADAAG). Accessible units shall be well dispersed throughout the development and shall not be grouped or clustered so as to create segregated pockets within the housing community.

1.b.(3) New Housing Site.

1.b.(3).(a) Sites. New housing under the FY01 project shall be constructed in the location as shown on the attachment entitled NEW CONSTRUCTION SITE PLAN. The FY01 project sites are located at the northwest end of base housing area "J" and Cannoneer Field and at the west end of housing area "U". The boundaries, show an area not to exceed approximately 4.9 acres (2.0 hectares) for siting the FY01 project housing area "J" and 4.4 acres (1.8 hectares) for housing area "U".

1.b.(3).(b) Housing Density. New housing units shall be distributed in Area "J" and Cannoneer Field and in Area "U" to provide desired layouts, balance and optimization of site work. Housing density in Area "J" and Cannoneer Field shall be medium density, 5-8- dwelling units per acre and for Area "U", 8-10 dwelling units per acre.

1.b.(3).(c) Site Work. New housing site work includes grading, storm drainage, pedestrian and vehicular circulation, utility systems, lighting, neighborhood parks, landscaping and erosion control. Design of new housing site work shall conform to Americans with Disabilities Act Accessibility Guidelines (ADAAG) and to Uniform Federal Accessibility Standards (UFAS). If there is a conflict between the two, then the more stringent one shall govern.

1.b.(3).(d) Tree Preservation. Existing trees identified for saving in the Tree Preservation Plan shall be an integral feature of the site plan. Siting shall provide adequate space for trees such that the trees continue to be a valuable asset to the housing community. Demolition, Project design and construction practices shall avoid altogether or minimize construction impacts on saved trees to ensure their long term survival, health, and structural stability.

1.b.(4) Demolition.

1.b.(4).(a) Demolition shall include the "Old Kalena Street", which traverses the housing area "U" new construction site project limits as indicated in the attached FY98 FHNC PN 39037 as-built Grading and Drainage Plan 2 of 2, Sheet .

1.b.(4).(b) Unless otherwise noted, demolition work shall include the removal and disposal of the following items as required to prepare the site for new construction within the project limits:

1.b.(4).(b).1/ Walks and street pavements to include curbs and gutters; drainage structures, pipes and culverts.

1.b.(4).(b).2/ Trees not identified for saving or transplanting. See Attachment TREE PRESERVATION DURING DEMOLITION AND CONSTRUCTION for requirements to protect saved trees during construction.

1.b.(4).(b).3/ Shrubs.

1.b.(4).(b).4/ Landscaping appurtenances to include any irrigation systems.

1.b.(4).(d) Disposal of debris and waste material shall be outside the limits of Government property, and shall be the contractor's responsibility. The contractor may at his option dispose of trees and shrubs by chipping the green waste and applying the material as a mulch layer 100 to 150 mm (4 to 6 in.) thick over bare ground surfaces of training grounds at Schofield Barracks to control soil erosion. The location of this material disposal site will be determined by the Director of Public Works, Schofield Barracks.

1.b.(5) Special Requirements.

1.b.(5).(a) General. Contractor shall be responsible for obtaining the latest construction and/or as-built plans. Survey controls indicated on the construction and as-built plans are provided for information only. Contractor is responsible for verifying accuracy of survey controls.

1.b.(5).(b) New housing structures shall not be located over any new or existing utility lines. Existing utility lines shall be relocated as necessary to clear all new structures.

1.b.(5).(c) Relocation of trees. The Contractor shall be required to transplant mature palm trees and broadleaf trees identified by the Government to locations either within or in close proximity to the project site.

1.b.(5).(d) The new area "U" housing units shall be accessed by the FY98 Area "U" housing residential street and a new residential street(s) connected by 90-degree intersection(s) at Kolekole Ave..

1.b.(5).(e) The FY99 Project and FY98 Project infrastructure and utility systems were designed and constructed with future connection points to accommodate additional family housing construction contained in the FY01 Project scope. Contractor is responsible for interfacing infrastructure and utility systems with the FY99 Project and FY98 Project systems. A copy of the FY98 Project and FY99 Project site work construction drawings are attached.

1.b (5).(f) The area immediately west of the area "U" project limits will be used for a future parking area for Solomon Elementary School. The contractor shall insure that adequate space is provided as shown on the attachment entitled NEW CONSTRUCTION SITE PLAN.

1.b.(5).(g) Contractor shall manage all hazardous waste (HW) and non-regulated hazardous material in accordance with instruction provided in the 25th ID(L) & USARHAW Installation Hazardous Waste Management Plan (IHWMP). In addition the Contractor shall store and manage all hazardous material (HM) in flammable/corrosive storage cabinets in accordance with OSHA/NFPA Codes. HM with the potential to cause harm to personnel or the environment (in the event of an unplanned or sudden release) shall be stored with secondary containment. The Contractor shall have a Spill Contingency Plan current to its construction operations/activity. The Government reserves the right to inspect the work site and any Government facility operated or maintained by the Contractor anytime without prior notice. To obtain a copy of the IHWMP and for other related information contact the Environmental Department, Directorate of Public Works at 656-1111.

1.b.(5).(h) Deleted.

1.b.(5).(i) Electrical. **For Area W**, reroute any existing circuits within the site to the boundaries of the project site as required to maintain utility service to remaining units in the area. For Area "W" site plan, see attached drawing sheet E-3.

1.b.(5).(j) Telecommunications and CATV. **For Area W**, reroute existing circuits within the site to the boundaries of the project site as required to maintain utility services to remaining units. All work must be coordinated with DOIM prior to the relocation of the circuits in the area. Oceanic Cable has indicated that a CATV power supply shall remain in service with a secondary voltage source on Carpenter Street. Also, they have indicated that there are fiber optic cables mounted on poles between buildings in Area W. Oceanic Cable has indicated that there will be a cost incurred for the relocation of these fiber optic cables. See Attachment #21, CATV Requirements for Area U and W. **For Area I**, a power supply on Ayres Avenue, below Building 701, is required to remain active with a secondary voltage source. See Attachment #20, CATV Requirements for Area I and J. Rerouting/relocation costs shall be included in the Contractor's proposal. The Contractor shall ensure that all telecommunications and CATV cabling is "cut and capped" at designated locations by authorized personnel. For any additional communication lines not shown on the topo, the Contractor shall contact DOIM at (808) 438-8071. For Area "W" site plan, see attached drawing sheet E-3.

1.c. Design Freedom. Requirements stated in this RFP express the minimum acceptable standards or features which the Government will accept in any proposal submitted. Design and maintainability/quality parts of proposals containing standards or features that exceed (in terms of innovation, creativity or cost-savings) the minimum acceptable standards contained herein shall be considered more advantageous to the Government than design and maintainability/quality parts of proposals that contain standards or features that do not, and may earn the offer a higher quality score for design and maintainability/quality (up to the maximum quality score allowable for those parts of the proposal) than an offer containing merely the minimum required standards or features. Existing housing plans or modifications thereto that meet the design and construction criteria specified herein, which the offeror is authorized to use for design and construction, may be submitted. Offerors may propose designs incorporating factory fabricated

components or modules. Deviations from space and adjacency requirements will not generally be favorably evaluated by the Government unless the change results in improvement to the facilities.

1.d. Family Housing Units. Site-built, factory-built, and manufactured-housing units are acceptable options for this project.

1.e. Definitions of Housing Types. Terms for housing types used in these criteria are defined as follows:

1.e.(1) Site-built housing. A residential building or dwelling unit wholly or substantially constructed at the site.

1.e.(2) Factory-built housing. Construction consisting of components, sub-assemblies such as modules, panelized walls, roof trusses, floor joists, and other factory-assembled components, which are transported to the construction site and further assembled into completed housing units. All interior and exterior walls, regardless of whether they are structural (load bearing) or not, are plant fabricated (panelized). Panels must be fabricated to the extent that the structure of the panel or truss is factory-assembled. Finishes such as interior wall board may be site applied.

1.e.(3) Manufactured housing. As defined in Public Law 93-383, Title 24, Chapter XX amended (1977, 1978, 1979, and 1980), a manufactured home is "a structure, transportable in one or more sections which in the traveling mode is eight body feet or more in width, or forty body feet or more in length, or, when erected on site, is built on a permanent foundation when connected to the required utilities, and includes the plumbing, heating, air conditioning and electrical systems contained therein."

1.e.(4) Apartment buildings. Living units on a single floor served by a central corridor. Apartment buildings of this type may be one to three stories.

1.e.(5) Garden apartments. Living units on a single floor with direct entry from a stairway landing. Units shall be full depth from front to back without intervening public corridors. Buildings shall be no more than three stories high, and designed so that no more than one stairway per module is required. Normally, no more than two units will be served by each stair landing.

1.e.(6) Duplex. One or two-story living units joined together by a common party wall and each unit entered directly from the exterior.

1.e.(7) Townhouses. One or two-story living units having one (end units) or more party walls. Configurations, such as triplexes, quadruplexes and up to six living units, are considered to be townhouses.

1.e.(8) Detached house. A single-family dwelling which is not attached to another dwelling.

1.e.(9) Garage. A private garage is a building or a portion of a building, not more than 93 m² (1,000 square feet) in area, in which only motor vehicles used by the tenants of the building or buildings on the premises are stored or kept.

1.f. Design Quality. The objectives are to obtain housing structures and complementary site development within funds available and to optimize livability. Design quality is achieved through the optimization of interior planning, integration of housing structures to the site and its natural resources such as existing trees, and balancing architectural attractiveness, variety, function, and design for low-cost maintenance and operation.

1.g. Installation Master Plan. The installation master plan provides comprehensive documentation of the existing conditions of natural, man-made and human resources. It also guides the future land-use development. The master plan should be consulted as it is the mechanism for ensuring that individual projects are sited to meet overall installation goals and objectives for land use development. This can be viewed at Rm. 319C, Bldg. 230, Engineering Services Division, Ft Shafter, Oahu, Hawaii.

1.h. Installation Exterior Architectural Plan (IEAP). Design of this project shall incorporate the design guidance and criteria contained in the IEAP, if no specific guidance/requirements are discussed in the RFP. This can be viewed at Rm. 319C, Bldg. 230, Engineering Services Division, Ft Shafter, Oahu, Hawaii.

1.i. Energy/Resources Conserving Features. Public Law 102-486, Executive Order 13123, and Federal Regulations 10 CFR 435, require Federal buildings to be designed and constructed to reduce energy consumption in a life-cycle, cost-effective manner using renewable energy sources when economical. Products designed to conserve energy and resources by controlling the amounts of consumed energy or by operating at increased efficiencies should be considered. Minimum requirements for this project are energy conservation fixtures, solar panels or heat pump water heater, time switches, and water flow-limiting plumbing fixtures. Offerors are required to provide Energy and Resource conserving improvements that at least insure compliance with the Energy Star Homes Program parameters.

1.j Prototype Family Housing Units. The purpose of the prototype family housing unit is to verify the details of the approved design and material selections and to establish the quality level against which the remaining work will be judged. At the plant, or at the site, construction connection details shall be exposed for study by authorized inspectors for a period of time determined by the Contracting Officer. The family housing unit or units at the plant and/or the prototype at the site are subject to Contracting Officer's approval. At the site, the complete prototype shall be constructed for each family housing unit type. Each stage of work shall be completed and accepted on the prototype prior to starting work on the same stage for similar family housing units in the project.

1.j.(1) "Site-Built." A prototype family housing unit shall be required for each family housing unit type, in accordance with FAR 9.306.

1.j.(2) "Manufactured" or "Factory-Built." A prototype family housing unit shall be required for each family housing unit type of each run fabricated at the plant for manufactured or factory-built homes.

1.j.(2).(a) Manufactured. If the family housing units are classified as manufactured housing, all interior and exterior systems which form integral parts of the transportable module shall be constructed and assembled for inspection by the Government. This shall include, as a minimum, wall/ceiling construction, interior finishes, utility piping, wiring, and ductwork fastening and assembling of adjacent modules, connection details to sinks, installed kitchen cabinets and countertops. Portions of the work shall be left unfinished or exposed to demonstrate interior construction details.

1.j.(2).(b) Factory-Built. If the family housing units are classified as factory-built housing, all wall panels which are fabricated in the plant for shipment to the site shall have prototype units constructed and assembled for in-plant inspection by the Government. This shall include, as a minimum, wall framing, roof/ceiling framing, connection details, utility piping, wiring and ductwork, interior and exterior wall finishes which form part of the factory-built wall. In addition, the Contractor shall construct as part of the factory-built prototype, installed samples of wall insulation, finished siding (if not part of wall assembly), sample installed bathtub and sink and installed kitchen sink and cabinets to demonstrate proper installation and wall connections. Portions of the work shall be left unfinished or exposed to demonstrate interior construction details.

1.j.(2).(c) If only one floor of the prototype is manufactured or factory-built, factory assembly of the manufactured or factory-built portion of the prototype is required. In all cases, the factory prototype shall consist of one of each building type. The factory prototype shall be assembled to verify assembly connections, details, construction, and transportation of the finished family housing units.

1.j.(2).(d) Manufactured and factory-built homes shall be of individual family housing units attached to one another in a manner which shall provide a finished structural assembly having an appearance and structural integrity comparable to a site-built single or multi-family residence built to applicable codes and local commercial standards.

1.j.(2).(e) Assembled family housing units shall be true and plumb and all within specified construction tolerances for all alignments represented on the drawings. Adjacent walls shall be attached at roof and

floor levels in such a manner as to preclude placing any wood member in cross-grain bending or cross-grain tension, and to avoid putting nails in withdrawal.

1.k. Metric Measurement. If dual measurements are shown in the RFP, the inch-pound (I-P) value shall govern while the metric measurement is provided for information.

1.l. Energy Star Homes Program Requirements: The contractor, at the direction of the USACE Contracting Officer's Representative, shall be required to submit to the EPA the necessary information and certifications to register the units constructed in this project as Energy Star Homes. The contractor constructing housing units in accordance with this Statement of Work is not required to be a registered Energy Star Contractor. The required information can be submitted to EPA in several methods:

1.l.(1) Through the Internet by clicking on the *certificate automation system* icon at the World Wide Website <http://yosemite.epa.gov/appd/eshomes.nsf> and following the instructions.

1.l.(2) By emailing to certificates@epa.gov.

1.l.(3) By mailing to the EPA Customer Service Manager (address and telephone number below).

The following information needs to be submitted for each home [Note: homes can be submitted individually (each home individually tested/rated) or in a "batch" (for batches of homes, particular unit types).] :

1.l.(3).(a) Contractor company name (example: Kamaaina Construction Company)

1.l.(3).(b) Contractor telephone number (example: 808-123-4567)

1.l.(3).(c) Name of company/organization performing testing/rating (example: Alii Construction Company)

1.l.(3).(d) Telephone number of company/organization performing testing/rating (example: 808-765-4321)

1.l.(3).(e) Street address of home being submitted, including city, state and zip code (example: 123 Main Street, Honolulu, Hawaii 96858)

1.l.(3).(f) Type of verification:

"FEP"---If this particular home underwent infiltration testing (and possibly duct leakage testing). Please list the tested infiltration value in ACH/nat (natural air changes per hour) and if tested, the duct leakage to nonconditioned spaces in cfm and percentage of air handler flow at a pressure of 25 pascals.

"SEP"---If this particular home did not undergo infiltration and/or duct leakage testing, but was a member of a batchout of which at least 15% DID; if so, then the address of a home that was a tested member of this batch should also be identified as the tested member of the batch.

1.l.(3).(g) The following statement: "This home qualifies as an EPA Energy Star Home by conforming to the residential energy efficiency specifications and quality control confirmation of U.S. Army Corps of Engineers TI 801-02, Family Housing, 02 October 2000, which has been determined by the EPA and USACE to be an **Equivalent Program** to the EPA Energy Star Homes Program." In addition, the "checklist" of home specifications that the USACE Contracting Officer's Representative uses to ascertain if the TI 801-02 specifications and testing results were met should be submitted. The statement and checklist should have the USACE Contracting Officer's Representative's signature affixed.

1.l.(3).(h) The year the house was built (example: 2001).

1.l.(3).(i) The year the house was submitted for Energy Star certification (example: 2001).

1.l.(3).(j) The name and title/rank, mailing address, email address, telephone number fax number of the USACE Contracting Officer's Representative overseeing the contractor's adherence to construction specifications, quality control of construction and testing/rating activities.

1.I.(4) The Contractor will make arrangements with the EPA for receipt of the “energy Star Homes” certificates and unit plaques and shall provide the certificates to the USACE Contracting Officer’s Representative and include in the project the installation of the plaques on each of the housing units. Coordination point with the EPA regarding Energy Star certification and plaques shall be as follows:

United States Environmental Protection Agency
Climate Protection Division
US EPA 6202J
Washington DC 20460
ENERGY STAR Homes Customer Service Manager
ATTN: Mr. Brian Ng, Ng.Brian@epa.gov; voice: 202-564-9162; fax: 202-565-2079;
<http://www.energystar.gov/homes>.

Technical questions on the Energy Star Homes Program, in general, can be addressed to:

ENERGY STAR Homes Technical Coordinator
ATTN: Mr. Glenn T. Chinery, Chinery.Glenn@epa.gov; voice: 202-564-9784; fax: 202-565-2079.

2. CRITERIA REFERENCES.

Criteria to be used for design and construction shall be taken from the most current references at the date of issue of the RFP. Administrative, contractual, and procedural features of the contract shall be as described in other sections of the RFP. Referenced codes and standards herein and those listed below are minimum acceptable criteria.

2.a. Local/State Codes or Standards. The following specifications, standards, bulletins and handbooks form a part of this document to the extent specified herein. Unless otherwise indicated, copies are available from the following locations. All City and County documents to include that of the Honolulu Board of Water Supply are available from the City and County of Honolulu book store in the City Hall at 530 S. King St., Honolulu, HI, 96813. State of Hawaii Dept. of Transportation Highways Div. documents are available from the State Dept. of Transportation Bldg., 869 Punchbowl St., Honolulu, HI, 96813.

2.a.(1) Technical Criteria. In the event of conflicts, technical requirements specified in these sections shall have precedence. Technical criteria to be used for design and construction shall be taken from the most current references at the date of issue of the Request for Proposals (RFP) and shall only be modified as described herein. Regional and local HUD policies and references to HUD field offices shall not apply to this contract. The Contractor shall construct improvements in accordance with State and local codes and standards, except as otherwise required by specific criteria included in this RFP. Codes and standards specifically referred to elsewhere in this RFP and those listed below shall be the minimum acceptable criteria.

2.a.(2) Site Design/Construction.

2.a.(2).(a) The Department of Public Works, Standard Specifications for Public Works Construction, City and County of Honolulu.

2.a.(2).(b) The Department of Public Works, Standard Details for Public Works Construction, City and County of Honolulu.

2.a.(2).(c) The Hawaii Statewide Uniform Design Manual for Streets and Highways, Hawaii State Department of Transportation, Highways Division.

2.a.(2).(d) The Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highways Administration.

2.a.(2).(e) The Hawaii Standard Specifications for Road and Bridge Construction, The State of Hawaii Department of Transportation, Highway Division.

2.a.(2).(f) Storm Drainage Standards, Department of Public Works, City & County of Honolulu.

2.a.(2).(g) Design Standards of the Division of Wastewater Management, Volume 1, Department of Public Works, City & County of Honolulu.

2.a.(3) Design/Construction Practices. The current Building Code of the City and County of Honolulu HUBC and Amendments.

2.a.(4) Water Supply System.

2.a.(4).(a) The Board of Water Supply, Water System Standards, City and County of Honolulu.

2.a.(4).(b) Approved Material List and Standard Details for Water Construction, The Board of Water Supply, City and County of Honolulu.

2.b. Federal Laws. The Federal laws and regulations listed in Table 2-1 form a part of this document. They are available from the Superintendent of Documents, Government Printing Office, Washington, DC 20402-9325 (202) 783-3238.

TABLE 2-1 - FEDERAL LAWS & REGULATIONS

CFR/USC No.	Description
P.L. 102-486	Energy Policy Act of 1992
10 CFR 430	National Appliance Energy Conservation Act (NAECA)
10 CFR 435	Voluntary Performance Standards for New Commercial and Multi-Family High Rise Residential Buildings; Mandatory for Federal Buildings
10 CFR 436	Methodology and Procedures for Life Cycle Cost Analyses
40 CFR 247.12	Comprehensive Procurement Guideline for Products Containing Recovered Materials, Construction Products
10 USC 2826	Public Law 97-214, Military Construction and Military Family Housing
24 USC 5301	Public Law 93-383, Community Development
42 USC 4321-4361	National Environmental Policy Act (NEPA)
42 USC 4901-4918 & 49 USC 1431	Noise Control Act of 1972
42 USC 5401-5426	Federal Manufactured Housing Construction and Safety Standards Act of 1974
Army Regulation 200-1	Environmental Protection and Enhancement, May 1990
E.O. 13123	Greening the Government Through Efficient Energy Management

2.c. Federal/Specifications, and Standards. The specifications and standards listed in Table 2-2 and Table 5-9 form a part of this document to the extent specified herein. Federal Standard, Uniform Federal Accessibility Standards, and federal specifications are available from Commanding Officer, Naval Publications and Forms Center, ATTENTION: NPODS, 5801 Tabor Avenue, Philadelphia, PA 19120-5099.

2.d. Other Government Documents and Publications. The following Government documents and publications form a part of this document to the extent specified herein.

2.d.(1) NBS Handbook 135, Life-Cycle Costing Manual for the Federal Energy Management Program. Available from the National Institute of Science and Technology, formerly National Bureau of Standards (NBS).

2.d.(2) The following United States Environmental Protection Agency criteria is available from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 (703) 487-4650: EPA/600/8-88/087, Radon-Resistant Residential New Construction; EPA/625/5-88/024, Application of Radon Reduction Methods; and EPA/625/5-87/019, Radon Reduction Techniques for Detached Houses.

2.d.(3) U.S. Department of Transportation, Federal Highways Administration. The following document shall be used for road and street design: The Manual On Uniform Traffic Control Devices For Streets and Highways. It is available from the Superintendent of Documents, U.S. Government Printing Office, Washington D.C. 20402.

2.d.(4) Copies of the FIPS publication are for sale by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161.

2.d.(5) Americans with Disabilities Act Accessibility Guidelines (ADAAG). Available from U.S. Architectural and Transportation Barriers Compliance Board, Suite 1000, 1331 F Street, N.W., Washington, D.C. 20004-1111 (202) 272-5434.

2.d.(6) MIL-HDBK 1008C Fire Protection for Facilities Engineering, Design, and Construction may be obtained at the Corps of Engineers Huntsville Engineering and Support Center web site under "Techinfo". The web site address is <http://www.hnd.usace.army.mil/>.

2.e. Non-Government Publications. The following publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are Department of Defense (DoD) adopted are those listed in the Department of Defense Index of Specifications & Standards (DODISS).

2.e.(1) Air-Conditioning and Refrigeration Institute (ARI). Information listed below is available from ARI, 4301 Fairfax Dr., Suite 425, ATTN: Pubs Dept., Arlington, VA 22203; voice: 703-524-8800; fax: 703-528-3816; Internet E-mail: ari@dgsys.com; Directory of Certified Unitary Air Conditioners, Unitary Heat Pumps and Sound Rated Outdoor Unitary Equipment; ARI 210/240, Unitary Air Conditioning and Air-Source Heat Pump Equipment: <http://www.ari.org/>

2.e.(2) Air Movement and Control Association, Inc. (AMCA). AMCA 210, Laboratory Methods of Testing Fans For Rating, is available from AMCA, 30 West University Drive, Arlington Heights, IL 60004 (312) 394-0150: <http://www.amca.org/>

2.e.(3) American Architectural Manufacturers Association (AAMA) specifications as shown in Table 2-2 are available from AAMA, 2700 River Road, Suite 118, Des Plaines, IL 60018 (312) 699-7310.

**TABLE 2-2 - AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION
SPECIFICATIONS**

No.	Description
AAMA 101	Voluntary Specification for Aluminum Prime Windows and Sliding Glass Doors
AAMA 101V	Voluntary Specification for Poly (Vinyl Chloride) (PVC) Prime Windows and Sliding Glass Doors
AAMA 1002.10	Voluntary Specifications for Aluminum Insulating Storm Products for Windows and Sliding Glass Doors
AAMA 1402	Standard Specifications for Aluminum Siding, Soffit, and Fascia

2.e.(4) Aluminum Association P.O. Box 753 Waldorf, MD 20601 (301) 843-0159

2.e.(5) American Association of State Highway and Transportation Officials; 444 North Capital, NW, Suite 225 Washington, D.C. 20001 (313) 532-2600

2.e.(6) American Concrete Institute. ACI 318, Building Code Requirements for Reinforced Concrete is available from ACI, P.O. Box 19150, Detroit, MI 48219-0150 (318) 532-0655

2.e.(7) American Iron and Steel Institute Cold-Formed Steel Design Manual (1996) and AISI RG-930, Residential Steel Framing Manual, are available from AISI, 1133 Fifteenth St., NW, Suite 300, Washington, DC 20005; voice: 202-452-7100

2.e.(8) American Wood Preservers Association. AWPAC M4, The Care of Preservative-Treated Wood Products, is available from AWPAC, P.O. Box 286, Woodstock, MD 21163-0286; (301) 465-3169

2.e.(9) American Gas Association (AGA). AGA Z21.1, American National Standard for Household Cooking Gas Appliances, is available from the American Gas Association, 1515 Wilson Blvd., Arlington, VA 22209; voice: 703-841-8556; fax: 703-841-8406: <http://www.aga.org/>.

2.e.(10) American National Standards Institute, Inc. (ANSI). Copies of the standards listed in Table 2-4 are available from ANSI, 1430 Broadway, New York, N.Y. 10018; voice: 212-642-4900; fax: 212-302-1286: <http://www.ansi.org/>

TABLE 2-3 - AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)/AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) STANDARDS

Std. No.	Std. Description
A112.19.1	Enameled Cast Iron Plumbing Fixtures
A112.19.2	Vitreous China Plumbing Fixtures (DoD Adopted)
A112.19.3	Stainless Steel Plumbing Fixtures (Designed for Residential Use)
A112.19.4	Porcelain Enameled Formed Steel Plumbing Fixtures (DoD Adopted)
A112.19.5	Trim for Water-Closet Bowls, Tanks, and Urinals (Dimensional Standards) (DoD Adopted)
A161.1	Recommended Construction and Performance Standards for Kitchen and Vanity Cabinets
B16.5	Steel Pipe Flanges and Flanged Fittings (DoD Adopted)
B16.22	Wrought Copper and Copper Alloy Solder Joint Pressure Fittings (DoD Adopted)
B16.26	Cast Copper Alloy Fittings for Flared Copper Tubes (DoD Adopted)
C2	(IEEE) National Electrical Safety Code
ANSI C105 AWWA A21.5	Polyethylene Encasement for Ductile-Iron Pipe Systems
Z60.1	American Standard for Nursery Stock
Z124.1	Plastic Bathtub Units
Z124.2	Plastic Shower Receptors and Shower Stalls

2.e.(11) American Plywood Association. APA B840-K-88, 303 Siding Manufacturing Specifications, are available from the American Plywood Association, P.O. Box 11700, Tacoma, WA 98411 (206) 565-6600.

2.e.(12) American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) documents, listed in Table 2-5, are available from ASHRAE, 1791 Tullie Circle, N.E., Atlanta, GA 30329; voice: 404-636-8400; fax: 404-321-5478: <http://www.ashrae.org/>

**TABLE 2-4 - AMERICAN SOCIETY OF HEATING, REFRIGERATION,
AND AIR-CONDITIONING ENGINEERS (ASHRAE)**

Number	Description
ASHRAE	Handbook of Fundamentals
ASHRAE	Residential Cooling Load Calculations
ASHRAE 52	Method of Testing Air Cleaning Devices used in General Ventilation for Removing Particulate Matter
ASHRAE 62	Ventilation for Acceptable Indoor Air Quality
ASHRAE 111	Practices for Measurement, Testing, Adjusting, and Balancing of Building Heating, Ventilation, Air Conditioning, and Refrigeration Systems

2.e.(13) American Society of Mechanical Engineers (ASME). ASME B16.11, Forged Fittings, Socket-Welding and Threaded is available from ASME; 22 Law Drive; Box 2300; Fairfield, NJ 07007-2900; voice: 800-843-2763; fax: 201-882-1717: <http://www.asme.org/>

2.e.(14) American Society of Sanitary Engineers (ASSE). ASSE 1006, Residential Use (Household) Dishwashers, ASSE 1017, Thermostatic Mixing valves, and ASSE 1008, Food Waste Disposal Units, Household, are available from ASSE, PO Box 40362, Bay Village, OH 44140; voice: 216-835-3040; fax: 216-835-3488.

2.e.(15) American Society for Testing and Materials (ASTM) specifications listed in Table 2-5 are available from ASTM, 1916 Race Street, Philadelphia, PA 19103: voice: 215-299-5585; fax: 215-977-9679: <http://www.astm.org/>

**TABLE 2-5 - AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
SPECIFICATIONS**

Spec. No.	Spec. Description
A53	Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
A525	Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process
A526	Specification for Steel Sheet Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality (DoD Adopted)
B117	Method of Salt Spray (Fog) Testing (DoD Adopted)
C90	Specification for Hollow Load-Bearing Concrete Masonry Units (DoD Adopted)
C31	Making and Curing Concrete Test Specimens in the Field

**TABLE 2-5 - AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
SPECIFICATIONS**

Spec. No.	Spec. Description
C39	Compressive Strength of Cylindrical Concrete Specimens
C172	Sampling Freshly Mixed Concrete
C216	Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale) (DoD Adopted)
D1557	Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft 2700kN-m/m)
D1785	Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120 (DoD Adopted)
D2513	Standard Specification for Thermoplastic Gas Pressure Piping (DoD Adopted)
D2683	Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing (DoD Adopted)
D2846	Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Hot and Cold-Water Distribution Systems (DoD Adopted)
D3018	Specification for Class A Asphalt Shingles Surfaced with Mineral Granules (DoD Adopted)
D3679	Specification for Rigid Poly (Vinyl Chloride) (PVC) Siding
E84	Standard Test Method for Surface Burning Characteristics of Building Materials (DoD Adopted)
E90	Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions (DoD Adopted))
E108	Standard Methods of Fire Tests of Roof Coverings
E119	Standard Methods of Fire Tests of Building Construction and Materials
E162	Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source (DoD Adopted)
E283	Standard Test Method for Rate of Air leakage Through Exterior Windows, Curtain Walls, and Doors
E330	Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference
E336	Standard Test Method for Measurement of Airborne Sound Insulation in Buildings
E547	Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential
E779	Measuring Air Leakage by the Pressurization Method
E1007	Standard Test Method for Field Measurement of Tapping Machine Impact Sound Transmission Through Floor-Ceiling Assemblies and

**TABLE 2-5 - AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
SPECIFICATIONS**

Spec. No.	Spec. Description
	Associated Support Structures
E1465	Standard Guide for Radon Control Options for the Design and Construction of New Low-Rise Residential Buildings
F1292	Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment
E1423	Standard Practice for Determining the Steady State Thermal Transmittance of Fenestration Systems
E1554	Determining External air Leakage of Air Distribution Systems by Fan Pressurization.
F1487-93	Standard Consumer Safety Performance Specification for Playground Equipment for Public Use
G90	Standard Practice for Performing Accelerated Outdoor Weathering of Nonmetallic Materials Using Concentrated Natural Sunlight

2.e.(16) American Water Works Association, Inc. (AWWA). Specifications are available from AWWA, 6666 Quincy Ave., Denver, CO 80235; voice: 800-926-7337; fax: 303-795-1989; <http://www.awwa.org/>. AWWA standards called for the standards of the Board of Water Supply, City and County of Honolulu, the following apply: AWWA C907 PolyVinyl Chloride (PVC) Pressure Fittings for Water - 4 Inch Through 8 Inch (100 mm Through 200 mm).

2.e.(17) Associated Air Balance Council (AABC). AABC MN-1, National Standards for Total System Balance, is available from AABC, 1518 K Street NW, Washington, DC 20005; voice: 202-737-0202; fax: 202-638-4833; <http://www.aabchq.com/>

2.e.(18) Builders Hardware Manufacturers Association, Inc. (BHMA). Specifications shown in Table 2-6 are available from the Builders Hardware Manufacturers Association, Inc. (BHMA), 355 Lexington Ave.; New York, New York; voice: 212-661-4261; fax: 212-370-9047.

TABLE 2-6 - AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) SPECIFICATIONS

No.	Description (Specs. are DoD Adopted)
ANSI/BHMA A156.1	Butts and Hinges
ANSI/BHMA A156.2	Bored and Preassembled Locks and Latches
ANSI/BHMA A156.4	Door Controls, Closers
ANSI/BHMA A156.5	Auxiliary Locks and Associated Products
ANSI/BHMA A156.12	Interconnected Locks and Latches

FY01 FHNC PN 48456, Replace Family Housing
Schofield Barracks, Oahu, HI

2.e.(20) CISPI Cast Iron Soil Pipe Institute 5959 Shallowford Rd., Suite 419 Chattanooga, TN 37421
(615) 892-0137

2.e.(21) Council of American Building Officials (CABO), One and Two Family Dwelling Code and Model Energy Code, are available from The Council of American Building Officials, 5203 Leesburg Pike, Suite 708; Falls Church, Virginia 22041: fax: 703-379-1546: <http://www.intlcode.org/>

2.e.(22) American National Standards Institute/Telecommunications Industry Association/Electronic Industries Association (ANSI/TIA/EIA) Standards. Standards shown below are available from Global Engineering Documents, 15 Inberness Way East, Inglewood, Colorado, 1(800)854-7179.

2.e.(22).(a). ANSI/TIA/EIA 570 - Residential and Light Commercial Telecommunications Wiring Standards

2.e.(22).(b). ANSI/TIA/EIA 568A - Commercial Building Telecommunications Cabling Standard

2.e.(22).(c). ANSI/TIA/EIA 606 - Administration Standard for the Telecommunications Infrastructure of Commercial Buildings

2.e.(22).(d). ANSI/TIA/EIA 607 - Commercial Building Grounding and Bonding Requirements for Telecommunications

2.e.(22).(e). ANSI/TIA/EIA 569A -Commercial Building Standard for Telecommunications Pathways and Spaces.

2.e.(23) Federal .Specifications, Order From:

General Services Administration Specification and Consumer Information
Distribution Section (WFSLS) Washington Navy Yard, Building 197
Washington, DC 20407
or
Commanding Officer
Naval Publications and Forms Center ATTN: NPODS
5801 Tabor Avenue Philadelphia, Pennsylvania 19120
PH: (215)697-2179 (Govt)
(215) 697-3321 (Industry)

2.e.(24) HAWTEL GTE Hawaiian Telephone Co. P.O. Box 2200
Honolulu, Hawaii 96841 Ph: (808) 422-5457

2.e.(25) HECO Hawaiian Electric Co. 900 Richards Streets
Honolulu, HI 96813 ph:(808) 548-7311

2.e.(26) HUBC Building Code of the City and County of Honolulu
(Amended UBC 1994 edition)
State of Hawaii

2.e.(27) HUFC Fire Code of the City & County of Honolulu
(Amended UFC 1988 edition)
State of Hawaii

2.e.(28) HVI Home Ventilating Institute 30 West University Drive
Arlington Heights, Illinois 60004 (312) 394-0150

2.e.(29) IEEE Institute of Electrical and Electronics Engineers
445 Hoes Ln. Piscataway, NJ 08854 (908) 981-1393

2.e.(30) IOS International Organization for Standardization

FY01 FHNC PN 48456, Replace Family Housing
Schofield Barracks, Oahu, HI

1 Rue De Varembe
Case Postale 56 CH-1211 Geneva 20
Switzerland (034) 012-0040

2.e.(31) Illuminating Engineering Society (IES), IES Lighting Handbook, is available from Illuminating Engineering Society of North America, 345 East 47th Street, New York, NY 10017.

2.e.(32) International Conference of Building Officials (ICBO), Uniform Building Code, is available from the International Conference of Building Officials (ICBO), 5360 South Workman Mill Road, Whittier, CA 90601 (213) 699-0541.

2.e.(33) National Association of Architectural Metal Manufacturers Association (NAAMA), Metal Finishes Manual, is available from the National Association of Architectural Metal Manufacturers Association (NAAMA), 600 South Federal Street, Chicago, IL 60605-1842 (312) 922-6222.

2.e.(34) National Association of Corrosion Engineers (NACE). NACE RP-0286, The Electrical Isolation of Cathodically Protected Pipelines, is available from NACE, P.O. Box 218340, Houston, Texas 77218.

2.e.(35) National Association of Plumbing-Heating-Cooling Contractors (PHCC). The National Standard Plumbing Code is available from National Association of Plumbing-Heating-Cooling Contractors (PHCC), PO Box 6808, Falls Church, VA 22046-1148, 1-800-253-4491.

2.e.(36) NEC: National Electrical Code (NFPA 70)

2.e.(37) National Electrical Manufacturers Association (NEMA) standards listed below is available from the National Electrical Manufacturers Association (NEMA), 2101 L Street N.W., Washington, D.C. 20037 (202) 457-8400: NEMA DC 3, Wall-Mounted Room Thermostats; and NEMA WD 1, General Requirements for Wiring Devices.

2.e.(38) NESC: National Electrical Safety Code (IEEE C2)

2.e.(39) National Environmental Balancing Bureau (NEBB). NEBB-01, Procedural Standards for Testing-Adjusting-Balancing of Environmental Systems, is available from NEBB, 1385 Picard Drive, Rockville, MD 20850 (301) 977-3698.

2.e.(40) National Fenestration Rating Council (NFRC). NFRC 100-91, Procedure for Determining Fenestration Product Thermal Properties, is available from NFRC, 1300 Spring Street, Suite 120, Silver Spring, MD, (301) 589-NFRC.

2.e.(41) National Fire Protection Association, Inc. (NFPA) codes listed in Table 2-8 are available from the National Fire Protection Association, Inc. (NFPA), Battery March Park, Quincy, MA 02269 (617) 770-3000.

TABLE 2-7 - NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) CODES

Code No.	Code Description
NFPA 13	Installation of Sprinkler Systems
NFPA 13R	Installation of Sprinkler Systems in Residential Occupancies Up To and Including Four Stories
NFPA 70	National Electrical Code (DoD Adopted)
NFPA 72	National Fire Alarm Code
NFPA 80	Standard For Fire Doors and Fire Windows
NFPA 101	Life Safety Code
NFPA 101M	Alternative Approaches to Life Safety
NFPA 255	Method of Test of Surface Burning Characteristics of Building Materials
NFPA 501A	Manufactured Home Installations
NFPA 501D	Recreational Vehicle Parks and Campgrounds
NFPA 701	Standard Methods of Fire Tests for Flame Resistant Textiles and Films

Note: Use current edition.

2.e.(42) National Sanitation Foundation, 3475 Plymouth Road, P.O. Box 1468, Ann Arbor, MI 48106 (313) 769-8010.

2.e.(43) National Wood Window and Door Association (NWWDA) standard, NWWDA I.S.2, Standard for Wood Window Units is available from the National Wood Window and Door Association (NWWDA), 205 Touhy Ave., Des Plaines, IL 60018 (312) 299-5200.

2.e.(44) REA RURAL ELECTRIFICATION ADMINISTRATION (REA)
Order From:

USDA-REA-ASD
Room 0180 ATTN: Publications
14th and Independence AV, SW
Washington, DC 20250 (202) 382-8674

2.e.(45) Sheet Metal and Air Conditioning Contractors National Association (SMACNA). SMACNA Installation Standards for Residential Heating and Air Conditioning Systems are available from SMACNA, 8224 Old Courthouse Road, Tysons Corner, Vienna VA, 22180.

2.e.(46) SEAOH Structural Engineers Association of Hawaii
P.O. Box 3348
Honolulu, Hawaii

2.e.(47) UBC Uniform Building Code (1994 Edition)
International Conference of building Officials
5360 South Workman Mill Road
Whittier, California 90601 (213) 699-0541
(As amended by the City and County of Honolulu)

2.e.(48) UFAS Uniform Federal Accessibility Standards. 1 Apr.88

2.e.(49) UFC Uniform Fire Code (1988 Edition)
International Conference of Building Officials
5360 South Workman Mill Road
Whittier, California 90601

2.e.(50) Underwriters Laboratories, Inc. (UL) specifications listed in Table 2-8 are available from the Underwriters Laboratories, Inc. (UL), 333 Pfingston Road, Northbrook, IL 60062; voice: 847-272-8800; fax: 847-509-6220: <http://www.ui.com/>

TABLE 2-8 - UNDERWRITERS LABORATORIES SPECIFICATIONS

Number	Description (Specs. are DoD Adopted)
UL 58	Steel Underground Tanks for Flammable and Combustible Liquids
UL 174	Water Heaters, Household Electric Storage Tank Type
UL 250	Household Refrigerators and Freezers
UL 430	Waste Disposers
UL 507	Electric Fans
UL 555	Fire Dampers
UL 746C	Polymeric Materials - Use in Electrical Equipment Evaluations
UL 749	Household Dishwashers
UL 858	Household Electric Ranges
UL 923	Microwave Cooking Appliances
UL 900	Test Performance of Air Filter Units
UL 1316	Glass Fiber - Reinforced Plastic Underground Storage Tanks for Petroleum Products
UL 1746	Standard for Safety External Corrosion Protection Systems for Steel Underground Storage Tanks
UL 2157	Electric Clothes Washing Machines and Extractors
UL 2158	Electric Clothes Dryers

3. SITE PLANNING AND DESIGN.

3.a. Scope. Imaginative site design is encouraged, however, the site boundaries, project composition, and gross density are fixed. Based on the graphic and narrative description of site opportunities and constraints provided, the Offeror will verify that the site is adequate to meet the project requirements.

3.b. Site Verification. The Contractor shall perform a site analysis and document the site opportunities and constraints to verify that the site meets the family housing program requirements that are provided. The analysis results are to be documented in a written and graphic summary of site ---opportunities and constraints for family housing. The site analysis shall consider land area required to provide adequate space for saved trees.

3.c. Area Development Plan. The Contractor shall provide a family housing area development plan that shows the spatial and functional arrangement of all family housing requirements. The plan should ensure an economical, compatible and functional residential land use development that utilizes the advantages of the site, fosters visual order, and provides a sense of community. The area development plan shows consideration for the site opportunities and constraints, family housing program requirements and specific site design criteria and guidance provided. The recommendations of the Installation master plan and design guide should be addressed.

3.c.(1) Density. The project site is approved for MEDIUM DENSITY. Land area for density calculations excludes slopes greater than 10 percent, major streets to curb face or limits as specified here-in, flood plains and flood areas, lakes and water courses.

3.c.(2) Land use. The plan for the area should reflect an optimum balance of unit floor area, open space, play lots, neighborhood parks, and pedestrian and vehicular circulation. The plan should show an efficient, organized and economical land use arrangement that is compatible and functional. This plan should show the relationship of the area to adjacent land uses.

3.c.(3) Noise. Use mitigation techniques to moderate predictable noise in accordance with the Installation Compatible Use Zone Program (ICUZ). All possible methods of mitigating the impact to the site and adjacent areas should be explored. Excerpts on the ICUZ are found as an attachment.

3.c.(4) Buffer area. Provide appropriate buffer areas to separate and visually isolate the community from undesirable external influences and to separate adjacent officer and enlisted personnel housing areas from each other. The width of a street should be a minimum acceptable buffer zone between officer and enlisted personnel housing areas. All possible methods of mitigating the impact to the site and adjacent areas should be explored.

3.c.(5) Tree Preservation Plan. The existing tree inventory for each project area is shown in the RFP drawings. The Tree Preservation Plan classifies each individual tree into one of four classes. Class A category trees shall be saved in place; Class B category trees shall either be saved in place or relocated within the project area; Class C category trees shall be relocated to a nearby site designated by the Government; Class E category trees shall be removed during the demolition phase of construction. (There is no Class D category).

3.c.(5).(a) Area J and U Objective. Area J and U will be utilized for new housing construction. The tree preservation plan will save the mature shade trees located along the existing streets and fence lines that form the perimeter of the project site and within the interior of the site which are not structurally defective and are of suitable species for the land use.

3.c.(5).(b) Area W Objective. Area W will be utilized for new housing construction in the near future. The tree preservation plan will save all existing mature trees which are not structurally defective and are of suitable species for the land use.

3.c.(5).(c) Utilization of Class A Trees. The offeror shall incorporate all Class A trees into the new project so that these trees will continue to be an asset to the urban community. These existing trees

shall be utilized for shade, windbreak, accenting entry ways, providing a focal point, or creating a sense of place for the community. The location of all Class A trees shall be identified in the offeror's Demolition Plan, Landscape Plan, Grading, and Utility Plans. See Attachment TREE PROTECTION for the requirements to protect Class A trees.

3.c.(5).(d) Tree Protection Zone. No grading, compaction, or construction activity shall occur in this zone immediately surrounding a Class A tree. All underground utilities, storm drains and irrigation lines should be routed outside the tree protection zone. If utilities must traverse the tree protection zone, they shall be tunneled or bored at a depth of 4 feet or greater within the zone. For monkey pod trees, banyans, and ear pods, the zone shall extend radially outward to 20 feet from the external surface of the trunk. For all other species, the zone shall extend to 15 feet. The zone shall be entirely enclosed by a temporary fence prior to any demolition work and shall remain in place until all site work and building construction are completed.

3.c.(5).(e) Transplanting Class B and C Trees. Except for monkey pod tree species, the Contractor shall transplant the trees utilizing hydraulic tree spade equipment with a diameter of not less than 6.15 m (7 ft.).

3.c.(6) Unit grouping. Variety in groupings, arrangements, and siting configurations of units is encouraged to fit varying terrain conditions and to provide compatible and functional residential layouts and street scapes. Building arrangements should be informal and imaginative with setbacks and orientation to provide for the best view, privacy and variety. The proper grouping of units will provide backyard screening, separation of pedestrian and vehicular traffic, neighborhood parks, and natural open spaces.

3.c.(7) Unit variation. Unit variation shall afford distinctly different exterior appearances within each unit type. Provide stylistic compatibility that will give the neighborhood a sense of order. Units shall vary in two or more of the following: Floor plans, massing, elevation, garage location, and exterior materials. One floor plan for each unit type is acceptable if sufficient variety is achieved by means of other variations mentioned above. In addition, units shall vary in color and siting. A reverse floor plan (mirror-image), although an acceptable means of creating variety, shall not constitute a unit change. Offerors shall comply with land-use restraints set forth. To accept the design freedom objective of this RFP, offerors are encouraged to offer 1-story and 2-story construction for detached, duplex, and townhouse units. The preferred colors are earth tones available in commonly used durable materials. The design should reflect life cycle maintenance and energy efficiency.

3.c.(8) Unit orientation. Housing units should be oriented, to the maximum extent possible, so that the long axis of the building is within 20 degrees east or west of true South, so that a major section of roof faces within 20 degrees of South. The purpose of proper orientation is to expose a minimum surface area to direct solar gain while allowing the units the potential for passive solar applications. Additional consideration will be given during quality evaluations with respect to unit orientations and passive solar applications considered and included. For additional passive solar information and considerations, see chapter 11 of this Statement of Work.

3.c.(9) Grading. The grading should maintain existing topography while recognizing standard gradients for the units and various functions. There should be a balance of the quantity of cut and fill which would create a smooth transition of regraded areas into the existing natural site. Grading should manage site runoff. The principles of positive drainage should be applied to control the conditions that remove rainfall away from facilities and functions. The natural grade shall be maintained within the tree protection zone of saved trees. Existing surface drainage patterns shall not be altered to direct water into the tree protection zone.

3.c.(10) Compatibility. The new housing development in area "J" and Cannoneer Field shall be coordinated to flow and interface with the family housing at Schofield Barracks that has been recently constructed and family housing that is currently being constructed. This includes the housing unit configuration and appearance as well as site development and utilities.

3.d. Site Design Criteria. The following specific criteria, based on site density, are to be used as guidance in site design, and proposals will be scored accordingly.

3.d.(1) Family housing units per hectare (ha) or acre (AC) by site density are shown in Table 3-1.

TABLE 3-1 - FAMILY HOUSING UNITS PER HECTARE (ACRE)

Pay Grade	Medium Density	
	Units/ha	Units/AC
O-1 thru O-3	14.8 - 22.2	6 - 9

3.d.(2) Maximum family housing units per building by grade are shown in Table 3-2.

TABLE 3-2 - MAXIMUM NUMBER OF FAMILY HOUSING UNITS PER BUILDING BY GRADE

Building Types	O-1 thru O-3
Duplexes	-
Townhouses	6

3.d.(3) Parking requirements per dwelling unit by site density.

Medium density: Two off-street spaces and 0.25 on-street guest spaces.

3.e. Building Setbacks and Spacing. Clearances between and adjacent to buildings must consider requirements for fire protection, safety, privacy, and emergency access in addition to the following minimum criteria. Setback or yard dimensions shall be from the building wall to an imaginary lot line around each building measured perpendicular to the building. Wall lengths with horizontal offsets of 2000 mm (6 ft) or more may be measured separately when determining yard depth. Distance between buildings shall be not less than the sum of setbacks or yards, specified here-in-after.

3.e.(1) Minimum setbacks and spacing for medium density sites is shown in Table 3-3.

TABLE 3-3 - MINIMUM SETBACKS AND SPACING, MEDIUM DENSITY SITES

Description	Meters	(Feet)
From front of house to curb when no parking exists at front of house.	6.1	20
Side of garage to curb.	4.6	15
Side of house to curb ¹ .	4.6	15
Between sides of garages and houses when detached ¹ .	1.6	5
Between outside walls of houses ¹ .	4.6	15
Between rear walls of houses.	12.2	40
Between side and rear walls of houses.	9.1	30

TABLE 3-3 - MINIMUM SETBACKS AND SPACING, MEDIUM DENSITY SITES

Description	Meters	(Feet)
Between street face of garage and near edge of sidewalk when second off- street parking space is next to garage.	2.5	8
Between street face of garage and near edge of sidewalk when second off-street parking space is between garage and street.	6.1	20

Note¹: When patios are located within a yard, the building wall separation will not be less than 12.2 m (40 ft).

3.e.(2) Minimum setbacks and spacing for medium density sites.

3.e.(2).(a) Wall definitions.

3.e.(2).(a).1/ Wall A contains the family housing unit main entrance; or the principal window(s) of the living room, dining room, or family room.

3.e.(2).(a).2/ Wall B contains window(s) other than in wall 'A.'

3.e.(2).(a).3/ Wall C contains no windows.

3.e.(2).(a).4/ Enclosure fence for dwelling unit yard or patio/lanai.

3.e.(2).(b) Building to building (each yard). Separation between different wall types shall conform to the greater separation requirement. When patios are located within a yard, the building wall separation will not be less than 12.2 m (40 ft).

3.e.(2).(b).1/ Wall A: 2000 mm (6 ft) + 600 mm (2 ft) for each level + 5 percent wall length, but not less than 6,600 mm (20 feet).

3.e.(2).(b).2/ Wall B: 1200 mm (4 ft) + 300 mm (1 ft) for each level + 5 percent wall length but not less than 5,000 mm (15 feet).

3.e.(2).(b).3/ Wall C: 3,300 mm (10 ft) minimum.

3.e.(2).(b).4/ Enclosure fence: 2,300 mm (7-1/2 ft.) minimum.

3.e.(2).(c) Building to street (face of curb).

3.e.(2).(c).1/ Wall A: 6100 mm (20 ft).

3.e.(2).(c).2/ Wall B and C: 4600 mm (15 ft).

3.e.(2).(c).3/ Enclosure Fence: 3000 mm (10 ft).

3.e.(2).(d) Garage to street (curb face).

3.e.(2).(d).1/ Front: 2500 mm (8 ft) (without parking).

3.e.(2).(d).2/ Side or Back: 4600 mm (15 ft).

3.e.(2).(e) Driveway length for parking, measured from near edge of sidewalk along street. Parked cars shall not block pedestrian traffic on sidewalks.

3.e.(2).(e).1/ To park one car: 6100 mm (20 ft).

3.e.(2).(e).2/ To park two cars in tandem: 12 200 mm (40 ft).

3.e.(2).(f) Building to retaining wall with a height of 1200 mm (4 ft) or more, above a floor with windows.

3.e.(2).(f).1/ Wall A: 4600 mm (15 ft).

3.e.(2).(f).2/ Wall B: 2300 mm (7 ft 6 inches).

3.e.(2).(f).3/ Wall C: 1500 mm (5 ft).

3.e.(3) Setback Notes.

3.e.(3).(a) Where the slope is 3:1 or steeper, top and toe of slope shall be a minimum of 4600 mm (15 ft) from the building.

3.e.(3).(b) Courts, outer and inner, shall have dimensions not less than the sum of the required yard distances. An inner court shall have a minimum area of 9.3 m² (100 ft²) for a one-story building and an additional 4.6 m² (50 ft²) for each additional story.

3.e.(4) Special Setback Requirements.

3.e.(4).(a) Cadet Sheridan Road (curb face) to buildings: 25.3 m (83 ft) minimum.

3.e.(4).(b) Williston Avenue (curb face) to buildings: 45.7 m (150 ft) minimum.

3.e.(4).(c) Capron Avenue (FY 02 Master Plan Alignment) (curb face) to buildings: 24.4 m (80 ft) minimum.

3.e.(4).(d) Kolekole Avenue (curb face to buildings 12.2 m (40 ft) minimum.

3.e.(4).(e) Existing fence line along Trimble Road and Solomon Elementary School (centerline of fence) to buildings: 6.1 m (20 ft) minimum.

3.e.(4).(f) Existing trees saved in place:

3.e.(4).(f).1/ For oval or round-shaped canopy trees, minimum setback from the trunk of tree to building wall A , B, or C shall be 7.7 m (25 ft).

3.e.(4).(f).2/ For large spreading canopied trees such as monkey pods, ear pods, and banyans, minimum setback from the trunk of tree to building wall A, B, or C shall be 12.2 m (40 ft). For buildings that do not clear the spread of the canopy of the tree, the contractor shall perform selective pruning to reduce the lateral spread of the canopy by not more than 10 feet to minimize the amount of branches overhanging the building.

3.f. Circulation, Parking, and Bus Stops. The vehicular and pedestrian circulation system shall promote safe, efficient movement of vehicles and pedestrians within the housing area. It should maintain the maximum separation of vehicles and pedestrians. Safe circulation systems have a clear hierarchy of movement, lead to a clear destination and do not interrupt other functions. The following criteria shall be considered for designing streets and drives for vehicles and pedestrians.

3.f.(1) Vehicular Circulation. Streets should provide adequate signage, maximum spacing between drives, right-angle turns, and control any conflicts between traffic. Streets should provide convenient access to housing units and all housing shall be accessible by emergency vehicles, trash pick-up vehicles, service vehicles, and moving vans.

3.f.(1).(a) Definitions. Terms for residential street and road types used in these criteria are defined as follows:

3.f.(1).(a).1/ Major residential streets. A through street serving local and adjoining housing developments.

3.f.(1).(a).2/ Secondary residential street. A through street serving local housing and connected to a higher category street.

3.f.(1).(a).3/ Loop. A secondary residential street with both ends open to traffic.

3.f.(1).(a).4/ Cul-de-sac. Only one end open to traffic and a turnaround (T, Y, or circle) at the other end.

3.f.(1).(a).5/ Court. A compact cul-de-sac providing common parking for overflow.

3.f.(1).(b) Cul-de-sac design. The circulation system may be based on cul-de-sacs. Cul-de-sacs shall be a maximum of 183 m (600 ft) in length measured from the center of the cul-de-sac to the centerline of the pavement of the connecting streets.

3.f.(1).(c) Intersection design. Provide "T" intersection offsets of at least 38 m (125 ft). The preferred angle of intersection is right-angle (90 degrees).

3.f.(2) Minimum street dimensions. Streets shall have the minimum dimensions shown in Table 3-4 measured face to face of curb:

TABLE 3-4 - MINIMUM STREET DIMENSIONS

Type of Street	On Street Parallel Parking (Guests & Services)	
	One Side	
	m	(ft)
Width, Residential Streets	8.5	28
Curb Radius at Intersections	6.0	20
Minimum Cul-de-sac Radius.	13.7	45
Minimum "T" Turn-around Size.	21.3 x 7.6	65 x 25

3.f.(3) Street design. New streets for Area "J,Cannoneer Field, and Area "U" shall be classified as residential streets. Streets shall be provided with integral type concrete curbs and 0.6 m (2 feet) wide gutters along both sides of streets. Curb face shall be vertical (barrier type) and shall be depressed at entrances to driveways. Asphaltic concrete curb and gutter will not be permitted. All gradients shall provide positive drainage (no ponding). Streets shall be designed for vehicles with not less than a 2,700-kg (6,000-pound), or local governing agency, code wheel load. Pavement shall be asphaltic concrete.

3.f.(4) Housing unit access drive. Access drives should provide physical and site distances which allow safe entry and exit. Housing unit entrances should relate to parking spaces to provide convenient and safe access. Access drives shall be at least 3.3m (10 ft) wide for each lane of traffic. Access drives serving more than eight units, or subject to service/emergency truck traffic shall be designed as a street. Access drives pavement shall be as for dwelling unit driveways.

3.f.(5) Privately owned vehicle (POV) parking. POV spaces shall be a minimum of 2.75m by 5.5m (9 ft by 18 ft). The design vehicle that is used to design this space shall be described. Where handicapped access is required, parking space width/length and accessible route clearances shall be provided as required to meet current Uniform Federal Accessibility Standards and Americans with Disabilities Act Accessibility Guidelines.

3.f.(5).(a) Off-street parking lots. With the exception of parking for the super playground off street parking lots are not acceptable.

3.f.(6) Bus stops. No bus stops will be required.

3.f.(7) Pedestrian circulation. Pedestrian circulation should be safe and relate to the housing units, parking and community facilities. Pedestrian circulation should be based on pedestrian desired lines of walking between facilities. Desired lines should be weighted to predict the most traveled routes. These routes shall be similar to paragraph 3.f.(8) sidewalk design. Topography and vegetation can be used to reinforce a sense of movement. Space should be provided where pedestrian traffic becomes concentrated.

3.f.(8) Sidewalk design.

3.f.(8).(a). Sidewalks shall be provided on both sides of the street. Walks shall be a minimum of 1,220 mm (4 ft) wide exclusive of curb width, and made of non-reinforced concrete with a minimum thickness of 100 mm (4 inches). Where walks are adjacent to the curb, the curb width is not to be included as sidewalk.

3.f.(8).(b). Ramps for handicapped individuals shall be provided at all intersections and wherever an accessible route crosses a curb. A separate handicapped ramp is required for each crosswalk. Sidewalks shall be widened when necessary to meet ramp slope criteria. Ramps for handicapped individuals shall follow City and County of Honolulu, Standard Detail R-25, dated September 1992 or later. Walks around the ramps shall be continuous, level and extend at least 1.22 m (4 ft) beyond the ramp unless otherwise approved in writing.

3.f.(8).(c). Front entry sidewalks shall be 1067 mm (42 inches) wide.

3.f.(9) Dwelling Unit Driveways.

3.f.(9).(a) Driveways for dwelling units shall be a minimum of 3m (10 feet) wide. Width shall be 4.0 m (13 feet) minimum when used for off-street parking, is curved or of extended length, and when several driveways are abutted to serve more than one dwelling unit. Driveway grades shall be such that vehicle are able to enter garages safely. This includes driver sight line when the vehicle enters and leaves garages. Driveway grades shall not exceed 8.33% (12 horizontal to 1.0 vertical). Driveway grades for handicapped units shall be 2 percent preferred or 4 percent maximum.

3.f.(9).(b) Driveway pavements shall be portland cement concrete (PCC) with thickness as required for soil conditions, but not less than 125 mm (5 inches). Pavement shall be reinforced with 6X6 W2.9XW2.9 galvanized welded wire fabric. Concrete shall be 3,000 psi minimum compressive strength. Compacted base course shall be provided under the PCC with thickness not less than 100 mm (4 inches). Design vehicle wheel load shall be not less than 6,000 pounds. Garages shall have PCC concrete slabs of the same design, except that granular termite barrier, minimum 100 mm (4 inches) thick shall be provided beneath the garage slabs, in lieu of base course. Garage slabs shall have a smooth, steel trowel finish. Steel reinforcement shall be supported on blocks or supports with base plates at spacing not exceeding 1 m each way. Welded wire fabric reinforcing may be substituted with minimum 1-1/2" fiber reinforced concrete as approved by the Contracting Officer.

3.f.(9).(c) Requirements for wheelchair access at any driveway. Slopes for driveway ramps at street connections shall not exceed 12 horizontal to 1.0 vertical along the driveway and along the sidewalk alignments. The City and County of Honolulu, Standard Detail R-29, shall be revised to show a minimum 1.5m (5 ft) wide standard concrete drop curb. In addition, Standard Detail R-29 which shows the standard driveway apron with a 1 inch vertical distance between the driveway drop curb top and the gutter invert shall be revised so that the driveway drop curb top is flush with the gutter invert or not to exceed 6 mm (1/4 inch). This is to allow handicapped access at any driveway.

3.f.(10) Crosswalks. Crosswalk and stop line striping shall be as shown in attachment entitled CROSSWALK & STOP LINE DETAIL.

3.f.(11) Construction of concrete curbs, gutters, streets, driveways, access drives, sidewalks and fences shall not be permitted within the tree protection zone unless such construction is for replacing the same that existed within the tree protection zone. Construction within the tree protection zone shall be designed to minimize damage to the tree and its root system. Tyvar bio-barrier or approved equal root barrier shall be installed within the tree protection zone to protect the new construction from future root damage.

3.f.(12) Any herbicides placed under paving materials must be safe for use around trees and labeled for that use. Any pesticides used on site must be tree-safe and not easily transported by water.

3.g. Street Furniture

3.g.(1) Street Signs: Street name signs and traffic control signs shall be provided where appropriate and shall conform to requirements of U.S. Department of Transportation, Federal Highway Administration Manual on Uniform Traffic Control Devices for Streets and Highways. Signs shall be made of aluminum. All support posts shall be breakaway type. Names of new streets created will be provided by the Contracting Officer. Street name signs background shall be brown in color. Height of sign above finished grade shall be 2.1 m (7 feet).

3.g.(2) Bus Stops: No bus stops will be required.

3.g.(3) Traffic Control Devices and Pavement Markings: Traffic control devices and pavement markings shall conform to the Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration, unless otherwise specified or approved. Centerline stripes are not required for secondary residential streets unless otherwise specified. Stop or approved bar stripes shall be provided at intersections at stop conditions.

3.h. Parking. Two (2) off-street parking spaces, one (1) covered, are required per family housing unit. Covered spaces shall be as specified in subparagraph GARAGES of paragraph FAMILY HOUSING UNIT, ARCHITECTURAL DESIGN. Where parking for two (2) or more units are provided adjacent to each other, the uncovered spaces shall be striped with minimum dimensions of 2.7 m (9 feet) by 5.5 m (18 feet) and both spaces shall be marked with the corresponding family housing unit identification number. The preferred residential parking is two (2) spaces designated for use by an individual family housing unit placed in tandem with the covered space located between the family housing unit and the uncovered space.

No designated visitor parking is required. Single sided, parallel, on-street open parking shall be provided on residential roads to provide a minimum of one space for four dwelling units. Such spaces shall be based on a minimum parking length of 6 m (20 feet) with 1.2 m (4 feet) minimum clearance to driveway edges and 3m (10 feet) clearance to fire hydrants. Housing building and driveway arrangements maximizing street parallel parking are encouraged. Painted markings for on-street parking are not required.

Parking for the disabled shall be provided in accordance with UFAS paragraph 4.6.3 for vans designed for handicapped persons. Individual family housing unit parking may be placed in tandem or gang configuration. When in gang configuration, a single family housing unit's spaces shall be side by side.

3.i. Refuse Collection. Refuse collection shall be made on a container basis. Each family housing unit shall have an aesthetically pleasing enclosure to store one 95-gallon trash container supplied and installed by the tenant after acceptance of the family housing units. One enclosure per family housing unit shall be provided. However, the adjacent family housing units in the same building may have enclosures adjacent to each other provided each family housing unit's space is strictly delineated by a wall, partition, or barrier. The enclosure shall be accessible to the family housing unit. The enclosure shall be located near the front of the unit or at the back of the garage rather than near the street. The enclosures shall

also be allowed inside the garage. Refuse collection shall be on a container basis only. Trash enclosures with hinged, securable closures are preferred to "open" enclosures.

3.j. Fencing. Chain link fencing, 1.2 m (4 feet) high, shall be provided .

For Area "J" and Cannoneer Field, the new fencing shall follow the alignment of the FY99 Project fencing along Cadet Sheridan Road and Hamilton Street and setback 3 m (10 feet) from the inside edge of curb along Williston Avenue. For Area "U", the new fencing shall follow the alignment of the FY98 Project fencing along Kolekole Avenue and Trimble road and along the existing fence alignment along the Solomon Elementary School boundary.

3.k. Landscape Planting Plan. The offeror shall employ the services of a qualified landscape architect, experienced in site planning and planting design, to develop a complete and integrated landscape plan for the entire project site. The plan shall provide trees and shrubs of adequate size, species, quantity and groupings planted in yards, common green areas and street scapes. Selected species shall be easy to maintain, locally hardy, and tolerant to the specific site conditions. Species selected shall exclude coconut palms, fruit trees, and poisonous plants. Planting or seeding shall occur only during periods when beneficial results can be obtained.

No plants shall be installed within 1.2 m (4 ft) of the unit's exterior wall. Tree planting distances from the houses shall be approximately equal to half of the tree's mature branch spread (i.e. diameter of canopy) with no trees planted within 3 m (10 ft) of the unit's exterior wall. Large canopied trees and trees with aggressive root systems shall not be planted within 6 m (20 ft) of underground utility lines and hard surfaces such as roads, sidewalks, and driveways. Tree plantings in the close proximity of underground utilities and hard surfaces shall be of species that are small to medium canopied with non-aggressive root systems with the center of the trunk having a minimum horizontal clearance of 0.75 m (2.5 ft) from the underground utility or hard surface. False olive trees shall be planted along Cadet Sheridan Road as shown in the attachment entitled CADET SHERIDAN TREE PLANTING.

3.k.(1) Trees, shrubs and ground cover. Plant varieties shall be nursery grown or plantation grown stock conforming to ANSI Z60.1. They shall be grown under climatic conditions similar to those in the locality of the project.

3.k.(1).(a) Quality. Well shaped, well grown, vigorous, healthy plants having healthy and well branched root systems shall be provided. Plants shall be free from disease, harmful insects and insect eggs, sun-scald injury, disfigurement and abrasion. Plants shall be provided that are typical of the species or variety and conforming to standards as set forth in ANSI Z60.1.

3.k.(1).(a).1/ Shade and flowering trees. A height relationship to caliper shall be provided as recommended by ANSI Z60.1. Height of branching should bear a relationship to the size and variety of tree specified and with the crown in good balance with the trunk. Trees shall not be "poled" or the leader removed.

3.k.(1).(a).1/ a/ Single stem. Trunk shall be reasonably straight and symmetrical with crown and have a persistent main leader.

3.k.(1).(a).1/ b/ Multi-stem. All countable stems, in aggregate, shall average the size specified. To be considered a stem, there should be no division of the trunk which branches more than 150 mm (6 in.) from the ground level.

3.k.(1).(a).1/ c/ Specimen. A plant shall be provided that is well branched and pruned naturally according to the species. The form of growth desired, which may not be in accordance with natural growth habit, shall be as indicated.

3.k.(1).(a).2/ Deciduous shrub. Plants shall be provided that have the height and number of primary stems as recommended by ANSI Z60.1. An acceptable plant shall be well shaped with sufficient well-spaced side branches recognized by the trade as typical for the variety grown in the region.

3.k.(1).(a).3/ Coniferous evergreen. Trees shall be provided that have the height-to-spread ratio as recommended by ANSI Z60.1. Trees shall not be "poled" or the leader removed. An acceptable plant shall be exceptionally heavy, well shaped and trimmed to form a symmetrical and tightly knit plant. The form of growth desired shall be as indicated.

3.k.(1).(a).4/ Broadleaf evergreen. Plants shall be provided that have ratio of height-to-spread as recommended by ANSI Z60.1. An acceptable plant shall be well shaped and recognized by the trade as typical for the variety grown in the region.

3.k.(1).(a).5/ Ground cover. Plants shall be provided with the minimum number of runners and length of runner as recommended by ANSI Z60.1. Plants shall be furnished that have heavy, well developed and balanced top with vigorous well developed root system and shall be furnished in containers.

3.k.(1).(b) Measurement. Plant measurements shall be in accordance with ANSI Z60.1.

3.k.(1).(b).1/ A list of recommended plants are as follows:

RECOMMENDED PLANT LIST

	<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>
<u>SMALL CANOPY TREES</u>		
	CASSIA GLAUCA	Kalamona Scrambled Eggs
	CONOCARPUS ERECTUS VAR. ARGENTEUS	Silver Button Wood

MEDIUM CANOPY TREES

ACACIA CONFUSA	Formosa, Koa
CASSIA GRANDIS	Coral Shower
CASSIA JAVANICA	Pink and White Shower
CASSIA JAVANICA X CASSIA FISTULA	Rainbow Shower
CHRYSOPHYLLUM OLIVIFORME	Satin Leaf
ELAEODENDRON ORIENTALE	False Olive
FILICIUM DECIPIENS	Fern Tree
LARGERSTROEMIA SPECIOSA	Giant Crepe Myrtle
CORDIA SUBCORDATA	True Kou

LARGE CANOPY TREES

SAMANEA ORIENTALE	Monkey Pod
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VERTICAL TREES

CUPRESSUS SENPERVIRENS	Italian Cypress
PODOCARPUS NERIIFOLIUS	Podocarpus
TABEBUIA DONNEL-SMITHII	Gold Tree

PALMS

ROYSTONEA REGIA	Royal Palm
VEITCHIA MERRILLII	Manila Palm

SHRUBS

ACALYPHA HISPIDA	Chenille Plant
ACALYPHA WILKESIANA	Beefsteak Plant
ALPINIA NUTANS	Shell Ginger
BELOPERONE GUTTATA	Shrimp Plant
CORDYLINE TERMINALIS	Green Ti
CORDYLINE TERMINALIS, 'PETER BUCK' CRINUM ASIATICUM	'Peter Buck' Ti
DICHORISANRA THYRSIFLORA	Blue Ginger
DRACAENA FRAGRANS	Fragrant Dracaena
DRACAENA MARGINATA	Halapepe, Money Tree
DRACAENA MASSANGEANA	Dracaena
ERVATAMIA DIVARICATA VAR FLORE-PLENO	Crepe Gardenia
GARDENIA TAITENSIS	Tiare Gardenia

HELICONIA HUMILIS	Lobster Claw
HELICONIA PSITTACORUM	Parrot's Beak Heliconia
HELICONIA ROSTRATA	Hanging Heliconia
HIBISCUS CAMERONII	Pink Hibiscus
HIBISCUS ROSA-SINENSIS	Red Hibiscus, Chinese Hibiscus
HIBISCUS SCHIZOPETALUS	Coral Hibiscus
IXORA CHINENSIS	Dwarf Ixora
LIGUSTRUM OVALIFOLIUM	California Privet
MALVAVISCUS ARBOREUS	Turks Cap, Sleeping Hibiscus
MURRAYA PANICULATA	Mock Orange
PHILODENDRON SELLOUM	Philodendron
PITTOSPORUM TOBIRA	Pittosporum
PLUMBAGO CAPENSIS	Plumbago
PSEUDERANTHEMUM RETICULATUM	Golden Eranthemum
RHAPHIOLEPIS UMBELLATA VAR OVATA	
RHODODENDRON SP	Azalea
STRELITZIA REGINAE	Bird of Paradise
THRYALLIS GALUCA	Spray of Gold, Galphimia

GRASSES

CYNODON DACTYLON	Common Bermuda Grass
LOLIUM MULTIFLOUM	Rye Grass
STENOTAPHRUM SECUNDATUM	Saint Augustine

GROUND COVERS

AGAPANTHUS UMBELLATUS	Blue African Lily
AGLAONEMA MODESTUM	Chinese Aglaonema
AGLAONEMA 'SILVER QUEEEN'	Silver Queen Aglaonema
ALTERNANTHERA AMOENA	Red Joyweed
ASPARAGUS SPRENGERI	Asparagus Fern
CANNA INDICA	Canna Lily
CARISSA GRANDIFLORA 'PROSTRATA'	Dwarf Carissa
CARPOBROTUS EDULIS	Hottentot Fig
CATHARANTHUS ROSEUS	Madagascar Perwinkle

CHLOROPHYTUM COMOSUM	Spider Plant, Ribbon Plant
DISSOTIS PLUMOSA	Dissotis
FICUS TIKUOA	Waipahu Fig
GAZANIA RIGENS	Pied Gazania
GAZANIA UNIFLORA LEUCOLEANA	Trailing Gazania
HELICONIA SP. CV. 'DWARF HUMILIS'	Jamaican Heliconia
HEMEROCALLIS SP.	Day Lily
HEMIGRAPHIS COLORATA	Hemigraphis
HYLOCEREUS UNDATUS	Night Blooming Cereus
IMPATIENS SULTANI	Impatiens
LANTANA CAMARA	Lantana
LANTANA SELLOWIANA	Trailing Lantana
LIGULARIA KAEMPFERI	Ligularia
LIRIOPE SPICATA	Liriope, Creeping Lilyturf
NEOMARICA GRACILIS	Walking Iris
OPHIPOGON JAPONICUS	Mondo
PILEA DEPRESSA	Creeping Charley
POLYPODIUM PHYMATODES	Laua'e Fern
PORTULACA GRANDIFLORA	Rose-Moss, Portulaca
RHOEO DISCOLOR VAR. DWARF	Dwarf Rhoeo
RUELLIA MAKOYANA	Ruellia, Monkey Plant
RUSSELLIA EQUISETIFOLIA	Firecracker Plant
SPATHIPHYLLUM 'MAUNA LOA'	Spathiphyllum 'Mauna Loa'
SPATHIPHYLLUM MCCOY HYB.	Spathiphyllum 'McCoy'
SPATHIPHYLLUM 'TASSON'	Spathiphyllum 'Tasson'
SYNGONIUM PODOPHYLLUM	Syngonium
WEDELIA TRILOBATA	Wedelia

3.k.(1).(c) Percolation test. Test for percolation shall be done to determine positive drainage of plant pits and beds. All soil and drainage conditions detrimental to the growth of plant material shall be identified and a proposal correcting the conditions shall be submitted.

3.k.(1).(d) Soil test. A soil test shall be performed for pH, chemical analysis and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of plant material specified.

3.k.(1).(e) Installation. Verify the location of underground utilities. When obstructions below ground or poor drainage affect the planting operation, proposed adjustments to plant location, type of plant and planting method or drainage correction shall be submitted. The plant material shall be installed during

appropriate planting times and conditions recommended by the trade for the type and variety of plant material specified. Plant pits shall be excavated and backfilled as recommended by the trade and ANSI Z60.1. The planting operation shall be performed only during periods when beneficial results can be obtained. When special conditions warrant a variance to the planting operations, proposed planting times shall be submitted.

3.k.(1).(f) Pruning. The total amount of foliage shall be pruned by one-fourth to one-third on installed trees and shrubs to compensate for loss of roots and transplanting shock. The typical growth habit of individual plants shall be retained. Trees shall not be poled or the leader removed, nor shall the leader be pruned or "topped off."

3.k.(1).(g) Maintenance during planting operation. Installed plants shall be maintained in a healthy growing condition. Maintenance operations shall begin immediately after each plant is installed and shall continue until the plant establishment period commences.

3.k.(1).(h) Plant establishment period. On completion of the last day of the planting operation, the plant establishment period for maintaining installed plants in a healthy growing condition shall commence and shall be in effect for the remaining contract time period not to exceed twelve months. When the planting operation extends over more than one season or there is a variance to the planting times, the plant establishment periods shall be established for the work completed.

3.k.(1).(i) Maintenance during establishment period. The maintenance of plants shall include straightening plants, tightening stakes and guying material, repairing tree wrap, protecting plant areas from erosion, maintaining erosion material, supplementing mulch, accomplishing wound dressing, removing dead or broken tip growth by pruning, maintaining edging of beds, checking for girdling of plants and maintaining plant labels, watering, weeding, removing and replacing unhealthy plants.

3.k.(1).(j) Unhealthy plant. A plant shall be considered unhealthy or dead when the main leader has died back, or 25 percent of the crown is dead. Determine the cause for an unhealthy plant. Unhealthy or dead plants shall be removed immediately and shall be replaced as soon as seasonal conditions permit in accordance with the following warranty paragraph.

3.k.(1).(k) Warranty. Furnished plant material shall be guaranteed to be in a vigorous growing condition for a period of twelve months regardless of the contract time period. A plant shall be replaced one time under this guarantee. The warranty shall also apply to existing trees on the job site that are either saved in place or relocated (transplanted).

3.k.(2) Turf. Turf consists of seed, sod and sprigs. There may be several different types of turf mixtures applied; one for lawn areas around housing units and one for field or recreation areas. In addition, turf species selected shall be suitable for the sunlight and shade condition existing around the housing units. Contractor shall specify percentage of rye grass permitted in seed mixture. However seed mixture shall contain no greater than 20% rye grass. The boundaries of each area shall be clearly defined on the planting plan. Turfed areas around each dwelling shall be established with minimum grass heights of 50 mm (2 inches). Final grassing shall be Common Bermuda or Saint Augustine.

3.k.(2).(a) Seed Quality. State approved seed of the latest season's crop shall be provided in the original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with applicable state seed laws. Seed mixtures shall be proportioned by weight. Weed seed shall not exceed one percent by weight of the total mixture.

3.k.(2).(b) Sod. State approved sod shall be provided as classified by applicable state laws. Each individual sod section shall be of a size to permit rolling and lifting without breaking.

3.k.(2).(b).1/ Quality. The sod shall be relatively free of thatch, diseases, nematodes, soil-borne insects, weeds or undesirable plants, stones larger than 50 mm (2 in.) in any dimension, woody plant roots and other material detrimental to a healthy stand of turf. Sod that has become dry, moldy, or yellow from heating, or has irregular shaped pieces of sod and torn or uneven ends shall be rejected.

3.k.(2).(b).2/ Thickness. Sod shall be machine cut to a uniform thickness of 30 mm (1-1/4 in.) within a tolerance of 5 mm (1/4 in.) excluding top growth and thatch. Measurement for thickness shall exclude top growth and thatch.

3.k.(2).(b).3/ Time limitation. The limitation of time between harvesting and placing sod shall be 36 hours.

3.k.(2).(c) Sprig quality. The cultivar shall be provided as healthy living stems, stolons, or rhizomes with attached roots, including two or three nodes, and shall be from 100 to 150 mm (4 to 6 in.) long, without adhering soil. Sprigs shall be provided which have been grown under climatic conditions similar to those in the locality of the project. Sprigs shall be obtained from heavy and dense sod, free from weeds or other material detrimental to a healthy stand of turf. Sprigs that have been exposed to heat or excessive drying shall be rejected. The time limitation between harvesting and placing sprigs shall be 24 hours.

3.k.(2).(d) Soil test. A soil test shall be performed for pH, chemical analysis and mechanical analysis to establish the quantities and type of soil amendments required to meet local growing conditions for the type and variety of turf specified.

3.k.(2).(e) Temporary turf cover. When there are contract delays in the turfing operation or a quick cover is required to prevent erosion, the areas designated for turf shall be seeded with a temporary seed. Provide Rye grass for temporary cover until Bermuda grass or St. Augustine grass is established. When no other turfing materials have been applied, the quantity of one-half of the required soil amendments shall be applied and the area tilled.

3.k.(2).(f) Installation. The turf shall be installed during appropriate planting times and conditions recommended by the trade for the type and variety of turf specified. The turf operations shall be performed only during periods when beneficial results can be obtained. Drainage patterns shall be maintained. The turf shall be installed by using the methods as recommended by the trade for the type and variety of turf specified.

3.k.(2).(g) Protection. Immediately after turfing, the area shall be protected against traffic or other use by erecting barricades and providing signage as required.

3.k.(2).(h) Turf establishment period. The turf establishment period for establishing a healthy stand of turf shall begin on the first day of work under the turfing contract and shall end three months after the last day of the turfing operation. An unsatisfactory stand of turf shall be repaired as soon as turfing conditions permit.

3.k.(2).(i) Satisfactory stand of turf.

3.k.(2).(i).1/ Seeded lawn area. A satisfactory stand of turf from the seeding operation for a lawn area is defined as Wwithin a 3.3 m (10 foot) diameter circle, there will be no more than two bare spots; each bare spot no larger than 0.3 m (12 inches) in diameter in the common areas. There will be no more than 3 bare spots of 150 mm (6 inches) or less in diameter in each yard. These are general guidelines and the Government may make reasonable adjustments during the pre-final inspections prior to acceptance.

3.k.(2).(i).2/ Sodded area. A satisfactory stand of turf from the sodding operation is defined as living sod uniform in color and texture. Bare spots shall be no larger than 50 mm (2 in.) square.

3.k.(2).(i).3/ Sprigged area. A satisfactory stand of turf from the sprigging operation is defined as a minimum of 20 sprigs per square meter. Bare spots shall be no larger than 230 mm (9 in.) square. The total bare spots shall not exceed 2 percent of the total sprigged area.

3.k.(2).(j) Maintenance during establishment period. The maintenance of the turfed areas shall include eradicating weeds, eradicating insects and diseases, protecting embankments and ditches from erosion, maintaining erosion control materials and mulch, protecting turf areas from traffic, mowing, watering, post-fertilization and replacing unsatisfactory turf areas.

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3.I. Sprinkler/Irrigation System. A temporary sprinkler/irrigation system shall be provided as required. Coordinate requirements with the using activity.

4. SITE ENGINEERING.

4.a. Soils and Pavements.

4.a.(1) Soils Investigation Report (Geotechnical Report). Preliminary Soils Investigation Reports dated February 1997 for Family Housing Area "U" and June 1998 for Family Housing Areas "I" & "J" are is furnished in attachment entitled Preliminary Soils Investigation Report. Based upon the data provided in the RFP and Preliminary Soils Investigation Report, a comprehensive Final Soils Investigation Report shall be furnished by the Offeror to whom this contract is awarded. The Final Soils Investigation Report shall be prepared by a professional engineer registered in the State of Hawaii with more than 10 years of experience in soil mechanics and geotechnical engineering. The Final Soils Investigation Report shall certify to the adequacy of the soil and foundation aspects of the design, including, but not limited to, special foundation types, earthwork construction, cut and fill slopes, surface and subsurface drainage, erosion and siltation prevention during and after construction, foundation stability, and settlement or heave. After Government review of the Final Soils Investigation Report, additional soil borings, testing, and investigation, if required, shall be furnished by the Offeror with the final design documents at no additional cost to the Government.

NOTE TO OFFEROR: The soils investigation report furnished by the Government is a Preliminary Report intended for basic information only. The boring logs indicate the approximate subsurface soil conditions encountered only at those times and locations where the borings were made, and may not represent conditions at other times and locations. The flexible pavement sections shall be as required for actual traffic and soil conditions, but in no case shall they be lighter (thinner) than that indicated below and in the Preliminary Soils Investigation Report. Should new traffic parameters or actual soil conditions require a heavier pavement structure, a thicker pavement section shall be furnished by the Offeror.

4.a.(2) Minimum Pavement Structures:

Residential Streets: 50 mm (2") Asphaltic Concrete, State DOT IV Mix 150 mm (6")
Base Course

4.a.(3) Soil Compaction.

4.a.(3).(a) Soil compaction shall be per local standards specified for use in this contract and as amended herein. Compact each layer to not less than the percentage of maximum density specified in Table 4-1, determined in accordance with ASTM D 1557 Method D:

TABLE 4-1 - SOIL COMPACTION

Subgrade Preparation, Fills, Embankments, and Backfills	Compaction Requirements (Percentage of Maximum Density)	
	Cohesive Material	Cohesionless Materials
Structures & Building Slabs	90	95
Streets, Paved Areas, Bike Paths	90	95
Sidewalks and Grassed Areas	85	90

4.a.(3).(b) The compaction requirements shall be verified or modifications shall be recommended by the soils engineer in the Final Soils Report wherever engineering, soils, or climatic factors indicate the necessity to do so. Any modification to the stated compaction requirements shall require the approval of the Contracting Officer.

4.a.(3).(c) Soil Classification.

4.a.(3).(c).1/ Cohesionless materials include materials classified in ASTM D 2487 as GW, GP, SW and SP. Cohesive materials include materials classified as GC, SC, ML, CL, and MH. Materials classified as GM and SM shall be identified as cohesionless only when the fines are nonplastic.

4.a.(3).(c).2/ Satisfactory materials for filling and backfilling under all structures and general earthwork shall comprise any excavated on-site materials or imported materials classified in accordance with ASTM D 2487 as GW, GM, GC, GP, SW, SP, SM, SC, ML, MH, and CL, free of organic matter, stones larger than 75 mm (3-inches) in any dimension and other deleterious materials. For imported materials, that portion passing the No. 40 sieve shall be either nonplastic or shall have a liquid limit not greater than 60 and a plasticity index not greater than 30. Liquid limit and plasticity index shall be determined by ASTM D 4318. Where satisfactory materials are not available in sufficient quantity from required excavations, borrow materials shall be obtained from approved sources off Government-control land at the Contractor's responsibility.

4.a.(3).(d) Soil shall not be compacted in the tree protection zone.

4.a.(4) Building (dwelling units including patios and garages) Slabs.

4.a.(4).(a) Granular Termite Barrier (GTB)

4.a.(4).(a).1/ Concrete Slabs-On-Grade: A 100 mm (4-inch) minimum thickness granular termite barrier shall be installed under all concrete slabs of the house, storage areas, lanai/patio, garage and adjoining door stoops, walkways and structures. GTB shall not be required under concrete driveways, except as specified in subparagraph: Garage to Driveway Interface. For slabs specified to be underlain by vapor barrier and capillary water barrier (CWB), the GTB shall be placed under the vapor barrier with a separation geotextile installed between the CWB and the GTB. For slabs not specified to receive vapor barrier and capillary water barrier, the GTB shall be installed over the prepared subgrade.

4.a.(4).(a).2/ Exterior Perimeter Footings: Typical GTB details at exterior footings are shown in Figure 1 of attachment entitled "Typical GTB Details". When "stayform" is used to retain a vertical face along the inside of exterior footings, the bottom of the stayform shall be elevated 50 mm (2 inches) above the bottom of the footing to allow GTB material to migrate beneath the bottom of the stayform and separate the stayform and the subgrade. Along the outside edge of the footing, a minimum 100 mm (4-inch) wide, vertical GTB-filled-trench shall be provided. A root control fabric impregnated with plastic nodules containing trifluralin, Bio-barrier Root Control, or equal, shall be installed along the vertical interface between the GTB and the adjacent soil. The root control fabric shall provide continuous and effective root control for 15 years or longer. A cast-in-place concrete strip, 300 mm (12-inch) wide by 75 mm (3-inch) thick, with 5% transverse slope, shall be provided at the ground surface to cap the GTB strip. The concrete strip shall be reinforced with 6/6 X W2.0 X W2.0 WWF. Contraction joints shall be provided at maximum 4'-0" spacing.

4.a.(4).(a).3/ Interior Footings: Typical GTB details at interior footings are shown in Figure 2 of attachment. When a vertical separation joint occurs through the interior thickened-edge footing, a pocket (strip) of GTB, minimum 200 mm (8 inches) wide and 100 mm (4 inches) thick shall be provided beneath the footing and centered across the separation joint.

4.a.(4).(a).4/ House to Garage/Patio Interface: Typical GTB details at the house to garage-patio interface are shown in Figure 3 of attachment. When garage or patio slabs have thickened-edge footings, a minimum 150 mm (6-inch) wide strip of GTB shall be placed beneath the garage or lanai footing where it abuts the house footing. When the bottom width of the garage or house footing is 300 mm (12 inches) or less, the GTB may extend across the full width of the footing in order to facilitate construction.

4.a.(4).(a).5/ Garage to Driveway Interface: Typical GTB details at the garage to driveway interface are shown in Figure 4 of attachment. A minimum 150 mm (6-inch) wide strip of GTB shall be placed beneath the thickened-edge driveway slab where it abuts the garage footing. Compacted base course, minimum 100 mm (4 inches) thick shall be provided beneath the remainder of the driveway slab.

4.a.(4).(a).6/ Exterior Column Footings: Typical GTB details at exterior column footings are shown in Figure 5 of attachment. Around the perimeter of the footing, a minimum 100 mm (4-inch) wide, vertical GTB-filled-trench shall be provided. A root control fabric, Bio-barrier Root Control, or equal, shall be installed along the vertical interface between the GTB and the adjacent soil. A cast-in-place concrete strip, 300 mm (12-inch) wide by 75 mm (3-inch) thick, with 5% transverse slope, shall be provided at the ground surface to cap the GTB strip. The concrete strip shall be reinforced with 6/6 X W2.0 X W2.0 WWF. Contraction joints shall be provided at maximum 4'-0" spacing.

4.a.(4).(a).7/ Subslab Drains, Conduits and Piping: Typical GTB details at subslab drains, conduits and piping are shown in Figures 6 and 7, of the attachment.

4.a.(4).(a).8/ The natural angle of repose of the GTB material is about 10H:3V when dry and 10H:3.75V when wet. Accordingly, GTB on sloping surfaces shall be placed at slopes no steeper than 3H:1V. This will require that the sloping faces of thickened-edge footings, including the under-side concrete fillet at edges of floor slabs, be designed with a batter no steeper than 3H:1V.

4.a.(4).(a).9/ GTB Material Gradation.

<u>Sieve Size</u>	<u>Percent Passing</u>
(4.75 mm) No. 4	100
(2.36 mm) No. 8	95 - 100
(2.00 mm) No. 10	75 - 95
(1.70 mm) No. 12	35 - 50
(1.18 mm) No. 16	0 - 10

4.a.(4).(a).10/ GTB Material Requirements

Rock Type:	Basalt
Specific Gravity (ASTM C 128):	2.70 to 2.80
SiO ₂ (ASTM C 289):	45% Minimum
L.A. Abrasion, % loss, 500 Revolutions (ASTM C 131):	20% Maximum
Moh Hardness Scale:	5 to 6

4.a.(4).(a).11/ GTB material installed shall be clean and free of debris, dirt or other non-GTB material/substances that would compromise the GTB effectiveness. When GTB is installed in layers, the surface of the layer receiving additional GTB material shall be clean. Previously installed material if not clean shall be removed and replaced prior to installing additional GTB material.

4.a.(4).(a).12/ Penetrations through the GTB other than that necessary for utility pipes/conduits shall not be made unless approved. Pipes laid in GTB material shall not be encased in sleeves or wraps that may provide a hidden path for termites. All utility pipes beneath the floor slab shall be encapsulated in minimum 100 mm (4 inches) of GTB material.

4.a.(4).(a).13/ GTB material shall be compacted using approved equipment and methods.

4.a.(4).(a).14/ No structure or appurtenance that is not protected by GTB shall be allowed to be in direct contact with the dwelling unit itself

4.a.(4).(a).15/ The Contractor's Design Proposal shall include typical GTB installation details beneath the house slab, garage slabs, patio/lanai slabs, adjoining walkway and door stoop slabs and at pipe penetrations. Typical GTB installation details should also be included for all interfaces between

adjoining slabs, such as between garage slab to driveway slab, house slab to lanai slab, house slab to garage slab and typical GTB installations around or adjacent to isolated column/pier footings.

4.a.(4).(a).16/ The Contractor shall submit a CQC plan to limit GTB material displacement before and during concrete placement. This is to maintain GTB material integrity and thickness for protection against termite infestation, and to maintain structural integrity of slabs and foundations.

4.a.(4).(b) Capillary Water Barrier and Vapor Barrier. Except as indicated hereinbelow, capillary water barrier and vapor barrier shall be placed beneath house concrete slabs on grade. Capillary water barrier and vapor barrier are not required under garage slabs, lanai/patio slabs, and walkway/door stoop slabs. The capillary water barrier shall be 150 mm (6 inches) thick, except that it may be reduced to 100 mm (4 inches) thick when used in conjunction with a granular termite barrier. The capillary water barrier material shall be a clean, crushed non-porous rock, crushed gravel or uncrushed gravel as approved. The maximum particle size shall be 40 mm (1-1/2 inches) and no more than 2 percent shall pass the 4.75 mm (No. 4) sieve. The capillary water barrier shall be compacted with a minimum of four (4) passes of a hand-operated, plate-type vibratory compactor. A vapor barrier shall be placed directly below the concrete slab and the GTB shall be installed over a separation geotextile which is installed over the CWB layer.

The vapor barrier shall have the following properties:

Minimum 15-mil thick polyolefin geomembrane manufactured with ISO certified virgin resins.		
Water Vapor Transmission Rate	ASTM E-96	not exceeding 0.006 gr./ft ² /hr.
Permeance Rating	ASTM E-96	not exceeding 0.015 gr./ft ² /hr.
Water Vapor Retarder	ASTM E-1745	meets or exceeds Class B
Puncture Resistance	ASTM E-1709	minimum 1970 grams
Tensile Strength	ASTM D-638	minimum 45 lbf/in.

Installation of the vapor barrier shall be per manufacturer's instructions with the following as the minimum; joints shall be lapped a minimum of 300 mm (12 inches) and sealed with the manufacturer's recommended mastic or pressure sensitive tape. The vapor barrier shall be lapped over footings or sealed to foundations. The contractor shall check the vapor barrier surface, seams and penetrations at columns and utilities for damage and discontinuities prior to the concrete slab placement. The check shall be performed in the presence of the contracting officers representative.

Standing water on the vapor barrier shall be removed prior to the concrete slab placement. The GTB shall be dampened and free of drainable water the day before vapor barrier placement. The general contractor shall protect all exposed GTB surfaces from ponding of water or rainwater by sealing any entry points in uncompleted slabs or in unroofed buildings.

The separation geotextile shall have the minimum requirements for Class 2 as specified in AASHTO M 288-96 for geotextile survivability requirements.

4.a.(4).(c) Garage Concrete Slab (Pavement). Garage concrete slab shall be as required for soil conditions, but not less than 125 mm (5 inches) thick. The concrete slab shall be reinforced with 6X6 W2.9XW2.9 galvanized welded wire fabric. The concrete shall have a minimum compressive strength of 20.7 mPa (3,000 psi) at 28 days with water-cement ratio not exceeding 0.45. Granular termite barrier, minimum 100 mm (4 inches) thick shall be provided beneath the garage slabs. Steel reinforcement shall be supported on blocks or supports with base plates at spacing not exceeding 1 m each way. Substitution of the welded wire fabric with minimum 1-1/2" long fiber-reinforced concrete is an option if approved by the Contracting Officer.

4.b. Water Distribution System. Water system design and construction shall be in accordance with the standards for the Board of Water Supply, City and County of Honolulu (BWS), unless otherwise specified herein or approved.

4.b.(1) Connections to Existing Systems. Connections to existing systems shall be made at locations specified herein, as indicated on the drawings or as approved.

For Area "J" and Cannoneer Field, a200 mm (8 inch) stub out connection will be provided under the FY99 Project on the southeast end of the project site. (For stub out location, see FY99 Project contract drawing sheet C-11, Zone C4 to C5.) On the northwest end an existing 150 mm (6 inch) water main runs parallel to Williston Avenue. The Contractor shall connect to the stub out and existing 150 mm (6 inch) main to provide a loop system. For Area "U", an existing 200 mm (8inch) stub out connection was provided under the FY98 Project on the northeast corner of the project site. (For stub out location, see FY98 Project As-built sheet C-20, Zone D3.) On the south end of the project site a 300 mm (12 inch) main runs parallel to Kolekole Avenue. The Contractor shall connect to the stub out and 300 mm (12 inch) main to provide a loop system.

4.b.(2) Mains. Mains shall be considered as that part of the distribution system that supply fire hydrants. Water mains shall be looped with no dead ends unless specifically approved in writing. Minimum main size shall be 200 mm (8 inches). Mains shall be ductile iron. All ductile iron pipes, cast iron fittings to include couplings and valves shall be wrapped with 8 mil thick polyethylene encasement per AWWA C105.

4.b.(3) Main Locations. Mains shall be generally located along streets setback a minimum of 1.5m (5 feet) from pavement areas, and on the street side opposite from electrical/telephone/CATV lines. Mains shall be setback a minimum of 1.5 m (5 feet) from any building or structure. This shall be specifically coordinated between civil and electrical design disciplines during proposal stage.

4.b.(4) Main Markers and Tracing Wires. All mains shall be provided with commercial plastic marking tape specifically manufactured for this use. Tracing wire shall be copper solid #10 and shall extend into valve box stations.

4.b.(5) Flow and Pressures. Flow requirements shall be per the BWS standards except that fire flow shall be 56.8 L/s (750 gpm) for one story dwelling units up to quadraplex size buildings, and 75.8 L/s (1,000 gpm) for two and three story housing buildings. Where service pressures to buildings exceed 1,034.2 kPa (75 psi), pressure regulators shall be provided for the service laterals. Pressure regulators shall be adjustable type and set for 689.5 kPa (50 psi).

4.b.(6) Fire Hydrants. Fire hydrant special requirements are as follows.

4.b.(6).(a) Fire hydrants shall be wet-barrel with one 4-1/2 inch and two 2-1/2 inch outlets. Fire hydrants shall be installed in accordance with National Fire Protection Association (NFPA) 24, Installation of Private Fire Service Mains and Their Appurtenances. Fire hydrants shall be spaced no more than 76.2 m (250 feet) apart, with the center of hose outlets a minimum of 0.45 m (18 inches) above finish grade.

4.b.(6).(b) Hydrants shall be located near intersections for maximum coverage and on fire truck approaches to buildings, especially for dead-end streets.

4.b.(6).(c) Hydrants shall be located a minimum of 4.6 m (15 feet) from buildings to include garages. Hydrants shall not be located in sidewalks or where obstructed by structures or landscaping. Hydrants shall not be located near electrical transformers or all types of utility manholes or handholes to preclude flooding should a break occur.

4.b.(6).(d) Hydrant locations along streets shall be identified with approved raised blue pavement reflector markers offset 100 mm (4 inches) towards the hydrant from the road center.

4.b.(6).(e) Hydrants shall be painted brown; exact color to be coordinated with the Contracting Officer.

4.b.(7) Service Laterals and Water Meters. Meters shall be provided to allow the monitoring of domestic water consumption for housing units. Meters shall serve contiguous housing building clusters and are preferred to be two standard sizes (38 mm or 1.5 inches and 50 mm or 2 inches). Meters shall be located in accessible areas out of the way of vehicular traffic. Special requirements are as follows.

4.b.(7).(a) Meters shall be of one manufacturer and of the same model for a given size. Meters shall be of the displacement or turbine type conforming to AWWA C700 or C701 unless otherwise specified or

approved. Meters shall be sized and of the appropriate type to insure adequate service pressures and flow can be maintained within manufacturer sizing recommendations.

4.b.(7).(b) Meters shall be installed in approved meter boxes or vaults large enough for the installation of a pressure regulating valve and meter and shall be large enough for easy maintenance and removal of meters. Meter registers shall be readily readable with reading ports in box covers provided. Shut off valves shall be provided on each side of meters. Straight pipe sections shall be provided when recommended by the manufacturer. Meters larger than 50 mm (2 inches) shall be provided with bypass line and valve of approved size. Meters and appurtenances shall generally conform to BWS standards and details unless otherwise approved.

4.b.(7).(c) Contractor shall as directed provide to the Contracting Officer for turn over to DPW a minimum of one meter splice and one spare meter for every twelve (12) meters of each size installed in this project. Additional items are not required for increments above even 12 meters.

4.b.(7).(d) When meters serve contiguous housing building clusters, the pressure regulator shall be installed in meter boxes or valve vaults after the meter. When a meter services a single building, the pressure regulator shall be installed above ground.

4.b.(7).(e) Service lines shall be engineered with housing interior plumbing to insure that wide fluctuations in pressure, water flow, and temperature do not occur. Meter headlosses shall be included in design analyses hydraulic calculations for domestic services.

4.b.(7).(f) Each dwelling unit shall have an exterior shut off valve installed above ground. Brass identification tags shall be provided with each valve to identify which unit the valve serves.

4.b.(7).(g) Service lines shall not cross streets except for connections to mains.

4.b.(7).(h) Service lines shall be copper pipe and fittings, Type "K".

4.b.(8) Water main Clearances to Sewers. Water mains shall be laid horizontally 3 m (10 feet) or more from sanitary sewers. Exception is where the bottom of the water pipe is a minimum of 450 mm (18 inches) above the sewer pipe top, in which case, the horizontal separation shall be 1.8 m (6 feet) or greater. Service lines shall have a minimum vertical separation of 300 mm (12 inches) above sewer laterals unless otherwise approved. Where water mains cross within 450 mm (18 inches) above or any distance below gravity flow sanitary sewer lines, the sewer pipe shall be encased with an approved reinforced concrete jacket of 150 mm (6 inch) minimum cover around the pipe to a distance of 3 m (10 feet) horizontally from the water line. Encasement shall start and end at sewer pipe joints.

4.b.(9) Miscellaneous Appurtenances. Miscellaneous appurtenances shall be as approved.

4.b.(10) Testing and Disinfection. Hydrostatic pressure tests shall be conducted in accordance with BWS standards except that test duration shall be 60 minutes and test pressure shall be 200 psi. Upon completion of tests, the contractor shall flush and disinfect the water system in accordance with AWWA C651. Chlorination shall be provided by the continuous feed method. Contractor shall be responsible for neutralization of and proper disposal of testing and disinfection waters in accordance with State of Hawaii and Tripler Army Medical Center, Preventive Medicine Office, regulations, etc.

4.b.(11) Interruption of Water Supply. Contractor shall inform the Contracting Officer a minimum of 45 calendar days in advance of any interruption of service in the existing water system. Valves shall be closed and opened only by DPW authorized personnel unless otherwise approved in writing.

4.b.(12) Pressure Reducing Valves. Main line pressure reducing valves are not permitted in this project.

4.c. Sanitary Sewage System. The sanitary sewage system shall be designed and constructed in accordance with the City and County of Honolulu standards unless otherwise specified herein or approved.

4.c.(1) Connections to Existing Systems and Layouts. Connections to existing systems shall be made at locations specified herein, as indicated on the drawings or as approved. Designer shall ensure that downstream systems have adequate capacity to meet peak design flows.

Contractor shall connect to stub outs at the following locations. For Area "J" and Cannoneer Field, a sewer manhole with a 200 mm (8 inch) stub out connection will be provided under the FY99 Project. (For stub out location, see FY99 Project contract drawing sheet C-11, Zone D4.) For Area "U", sewer manhole with a 200 mm (8 inch) stub out connection was provided under the FY98 Project. (For stub out location, see FY98 Project As-built sheet C-17, Zone D3.) The Contractor shall provide for the continued functionality, operation and maintenance of sewer lines through the family housing area that service buildings outside the family housing area.

4.c.(1).(a) Sewer mains shall be located along street or off-streets in readily accessible areas. Sewer mains in streets shall be located such that manholes are installed 2.4 m (8 feet) or greater from curb faces and away from street low points to minimize water infiltration.

4.c.(1).(b) Mains shall be 200 mm (8 inches) minimum size.

4.c.(1).(c) All mains shall be provided with copper solid #10 tracing wire.

4.c.(1).(d) Prior to design, the project civil engineer shall inspect the proposed connections points to existing manholes and determine if the sewer line is flowing near capacity. If the existing line is flowing near capacity, the invert of the new main should be set to be above the crown of existing main.

4.c.(1).(e) Connections to existing mains should be less than 90 degrees to the main line flow.

4.c.(1).(f) Pipe material for sewer mains and laterals shall be plastic pipe within minimal pipe joints.

4.c.(2) Manholes.

4.c.(2).(a) Precast manholes shall have eccentric cone tops.

4.c.(2).(b) Manholes shall have essentially water tight walls and pipe connections to control ground water infiltration.

4.c.(2).(c) Manholes deeper than 900 mm (3 feet) shall have stainless steel rungs, Type 316 SS.

4.c.(2).(d) Each new or modified manhole shall be installed with manhole cover inserts to prevent inflow of rainwater; reduce manhole rattling and flipping due to street traffic; and prevent dirt and debris from entering collection system through manhole cover. Manhole insert material and dimensions shall be in accordance with City and County of Honolulu Standards and as specified herein.

The inserts shall be made of corrosion proof material suitable for atmospheres containing hydrogen sulfide and diluted sulfuric acid as well as other gases associated with wastewater collection. The body of the material shall be made of high density polyethylene co-polymer, or approved equal that meets ASTM Specifications Designation D1248, Class A, Category 5, Type III, equal to Marlex HXM 50100 (extra high molecular weight hexene co polymer).

The manhole inserts shall have a minimum impact brittleness temperature of 105 degrees Fahrenheit or less. The thickness shall be uniform 1/8-inch or greater. The material shall be firm enough such that the inserts will not fold and fall into the manhole due to any accumulation of debris and water. It shall also be resistant to environmental stress cracking.

The gasket shall be made of closed cell neoprene. The gasket shall have pressure sensitive adhesive on one side and be placed under the weight bearing surface of the manhole insert by the manufacturer. The adhesive must be compatible with the insert material to form a long lasting bond in wet or dry conditions.

A lift strap shall be attached to the rising edge of the bowl of the manhole inserts with a stainless steel rivet. The lift strap shall be made of one inch (1") wide, woven polypropylene web and sheared on all cut ends to prevent unraveling. The inserts shall be sized to fit City and County of Honolulu Standard Type SA manhole frame and covers.

4.c.(2).(e) New manholes should be located to avoid bends 90 degrees or larger.

4.c.(3) Sewer Laterals.

4.c.(3).(a) Laterals minimum size shall be 100 mm (4 inches) when serving one or two housing units, and 150 mm (6 inches) for three or more housing units. Laterals shall be sized based upon fixture unit flow.

4.c.(3).(b) Minimum lateral slope shall be 1.0 percent unless otherwise approved.

4.c.(3).(c) Only house sewer lines may be placed under buildings; however, one sewer lateral may be provided for one housing building with multiple dwelling units provided adequate cleanouts are furnished to effect easy maintenance. Such sewer designs shall be as approved. Multiple dwelling unit single laterals shall have a cleanout installed where the line exits the structure and within 1.5 m (5 feet) of the exterior wall.

4.c.(3).(d) Laterals shall use standard "wye" fittings. Cleanouts shall be provided at all junctions and major bends as directed. Where laterals exceed 30 m (100 feet) in length, pipe size shall be 150 mm (6 inches) minimum and manholes shall be provided.

4.c.(3).(e) Cleanouts shall be of approved materials and design. They shall be installed flush with the finish ground to preclude damage to mower equipment and tripping. Cleanout cap shall be recess type. Cleanout tops in grassed areas shall be provided with a 375 mm (15 inch) square by 150 mm (6 inch) thick concrete collar reinforced with #3 rebar on all sides. Cleanouts shall not be located in driveways.

4.c.(3).(f) New lateral inverts should be above the crown of existing mains.

4.c.(4) Sewer Pipe Joints. Sewer mains within the tree drip line shall be wrapped at the joints with a 'bio' or root type barrier membrane. Root barrier shall be suitable for pipe joint wrap application and shall be installed in accordance with the manufacturer's specifications.

4.d. Grading and Storm Drainage System. Grading and storm drainage system design and construction shall be in accordance with the City and County of Honolulu standards unless otherwise specified herein or approved.

4.c.(1) Connections to Existing Systems. Connections to existing systems shall be made at locations specified herein, as indicated on the drawings or as approved.

For Area "J" and Cannoneer Field, a storm drain manhole with a 200 mm (8 inch) stub out connection will be provided under the FY99 Project. (For stub out location, see FY99 Project contract drawing sheet C-7, Zone D4.) The contractor shall connect to this stub out. For Area "U", an existing drainage ditch runs along Trimble Road and an existing drainline (diameter size varies 18 to 30-inch) runs from west to east through the FY01 Project the FY98 project site. The contractor shall connect to these systems. (For location of drainage system, see FY98 Project As-built sheet C-9 and C-10.)

A Notice of Intent (NOI) application for coverage under the State of Hawaii's general National Pollutant Discharge Elimination System (NPDES) permit will be prepared by the Government. The Contractor shall be responsible for any fees for the NPDES permit. The Contractor shall be responsible for preparing and submitting a construction activities storm water Best Management Practice (BMP) plan for approval in accordance with State of Hawaii Department of Health Administration Rules, Title 11, Chapter 55, Water Pollution Control.

4.d.(1) Grading and drainage design shall be properly coordinated with surrounding properties and facilities to insure that runoff does not cause damage outside of the project limits. Existing drainage patterns shall be maintained as much as practicable. For Area "J" and Cannoneer Field, drainage shall be away from Cadet Sheridan Road.

4.d.(2) Sumps and low points where water ponds shall be avoided whenever practical so as to preclude flooding of buildings and roads when design capacities of drainage systems are exceeded. Where sumps can not be avoided, higher design capacities may be directed for systems draining the sumps and positive overland flow relief provided to preclude flooding of dwelling units and critical utility appurtenances such as electrical transformers.

4.d.(3) Open ditches and channels are not allowed unless specifically approved. Grassed swales shall have a 1 percent minimum invert slope unless the invert is paved with and approved concrete lining. Swales shall have cross-sections that do not restrict the use of powered mowing equipment.

4.d.(4) Finish ground around buildings shall slope at 5 percent minimum for 3 m (10 feet) unless otherwise approved.

4.d.(5) Building floors (dwelling units and storage) shall be set a minimum of 150 mm (6 inches) above the finish grade at the building perimeter. Entrances are excluded from this requirement.

4.d.(6) Maximum graded slopes shall be 4 horizontal to 1 vertical unless otherwise approved. Retaining walls shall not be allowed within housing areas unless specifically approved.

4.d.(7) All drainage inlet and outlet structures with clear space width openings greater than 125 mm (5 inches) shall be made safe for children by providing metal grates to prevent them from entering. Drain inlets located in grassed areas shall have a concrete apron around each inlet. The concrete apron shall extend 0.5 m (1.5 ft.) from each edge of grate.

4.d.(8) Overland flow lengths shall be held to a minimum.

4.d.(9) All streets shall be crowned or sloped to drain. Concrete gutters shall be provided on both sides of streets. Street drain inlets shall be curb opening type. Drop inlets with grates are not allowed.

4.d.(10) Pipe culverts shall be 450 mm (18 inches) minimum size and reinforced concrete pipe for drainage along roadways and vehicle traffic areas. Pipe culverts for other areas shall be 300 mm (12 inch) minimum size and of reinforced concrete pipe, schedule 40 PVC pipe, or smooth interior corrugated polyethylene pipe. For corrugated polyethylene pipe, the coupling joints shall be the water tight type.

4.d.(11) Grade Transitions around Existing Trees

4.d.(11).(a) The natural grade shall be maintained within the tree protection zone. Surface drainage away from existing trees shall be provided.

4.d.(11).(b) For small grade changes up to 0.3 m (1 ft), the Contractor shall slope to natural grade. For larger grade changes, the Contractor shall construct retaining walls.

4.e. Electrical Distribution

4.e.(1) General:

4.e.(1).(a) Standards: All equipment, materials and appurtenances provided under this contract shall be suitable for the intended application and shall conform to the applicable standards of one or more of the following:

National Electrical Manufacturer's Association
American National Standards Institute

Insulated Power Cable Engineers Association
American Society for Testing and Materials
Institute of Electrical and Electronics Engineers.
Underwriters' Laboratories, Inc.

Where no such standards exist for any product provided under this contract, the Contractor shall demonstrate the suitability of the product, for the application intended, to the satisfaction of the Contracting Officer.

4.e.(1).(b) Grounding: All exposed non-current carrying metallic parts of electrical equipment, metallic raceway systems, grounding conductors and the neutral conductor of the wiring system shall be grounded, except where specifically indicated otherwise. The ground connection shall be made as required by Article 250 of the NEC. Where ground rods are required, they shall be 19 mm (3/4-inch) by 3000 mm (10-foot) copper-clad steel driven so the top is 150 mm (6 inches) below grade. Rods shall be tested for compliance with NEC ground resistance requirements prior to connection.

4.e.(1).(c) Locks: All enclosed electrical equipment shall be equipped with padlocks and furnished with two keys with each lock. All locks shall be master keyed.

4.e.(1).(d) Ducts: Duct lines shall be routed on the street side of the family housing units, along the streets. A minimum of one spare duct shall be provided. Duct lines shall not pass beneath any building structures. Similarly, building structures shall not be constructed over any duct line. All electrical primary ducts require concrete encasement. Electrical secondary, telephone, and cable television ducts shall be non-encased direct burial, except those ducts installed under roads or concrete driveways or other paved areas exceeding 1524mm (5 feet) in width which shall be encased with a minimum of 76 mm (3 inches) of concrete around each duct. Such encasement shall extend a minimum of 1524 mm (5 feet) beyond the edge of the road or paved area. Provide duct seal for where cable enters ducts and covers on spare duct openings. Field cuts requiring tapers shall be made with proper tools and match factory tapers. After an electrical duct line is completed, a standard flexible mandrel shall be used for cleaning followed by a brush with stiff bristles. Mandrels shall be at least 12 inches long and have diameters 1/4 inch less than the inside diameter of the duct being cleaned. For telecommunication ducts, the size of the mandrel shall be as DOIM specifies. For cable television ducts, a rigid 12 inch mandrel with diameter 1/4 inch less than the inside diameter of conduit shall be used for ducts larger than 53 mm (2 inch). A flexible mandrel with a diameter 1/4 inch less than the inside diameter of conduit shall be used only for 53 mm (2 inch) ducts. Mandrels shall be provided by Oceanic Cablevision only for final testing of CATV ducts. A coupling recommended by the duct manufacturer shall be used whenever an existing duct is connected to a duct of different material or shape. If burrs or obstructions are encountered in electrical, telecommunication, or cable television ducts, that section of the duct shall be replaced.

4.e.(1).(e) Concrete Encased Ducts: The encasement shall be a minimum of 76 mm (3 inches) of concrete around each duct. Separators or spacing blocks shall be made of steel, concrete, plastic, or a combination of these materials placed not further apart than 1219 mm (4 feet) on centers. Ducts shall be securely anchored to prevent movement during the placement of concrete and joints shall be staggered at least 152 mm (6 inches) vertically.

4.e.(1).(f) Nonencased Direct Burial Ducts: Where bottoms of trenches comprise materials other than sand or stone-free earth, 76 mm (3-inch) layers of sand or stone-free earth shall be laid first and compacted to approximate densities of surrounding firm soil before installing ducts in direct-contact tiered fashion. Joints in adjacent tiers of duct shall be vertically staggered at least 152 mm (6 inches). The first 102 mm (4-inch) layer of backfill cover shall be sand or stone-free earth compacted as previously specified. High-tiered duct banks shall use a wooden frame or equivalent form to hold ducts in alignment prior to backfilling. Selected earth at duct banks shall be thoroughly tamped in 102 mm to 152 mm (4- to 6-inch) layers. Burial depth of non-encased ducts for cables with a rating of 600 volts or less and for telephone/television cables shall be a minimum of 610 mm (24 inches). Where non-encased ducts for telephone/television cables share the same trench with ducts for secondary cables with a rating of 600 volts or less, the ducts shall be separated not less than 305 mm (12 inches).

4.e.(1).(g) Duct Line Markers: Duct line markers shall be provided at the ends of long duct line stub-outs or for other ducts whose locations are indeterminate because of duct curvature or terminations at completely below-grade structures. A 5-mil brightly colored plastic tape not less than 152 mm (6 inches) in width and suitably inscribed at not more than 3048 mm (10 feet) on centers with a continuous metallic backing and a corrosion resistant 1-mil metallic foil core to permit easy location of the duct line, shall be placed approximately 305 mm (12 inches) below finished grade levels of such lines.

4.e.(1).(h) Conductors: All conductors shall be copper.

4.e.(1).(i) Nameplates: Each primary circuit breaker and secondary circuit breaker panel shall be identified with a laminated phenolic plastic nameplate. Each primary and secondary feeder shall be identified with a fiber or a non-ferrous metal tag.

4.e.(1).(j) Calculations and Diagrams: Complete single line diagrams shall be provided with calculations of available short circuit currents at transformers and circuit breakers; loads on all transformers and feeders; and voltage drops on primary lines and secondary services. Illumination and uniformity calculations for street lights shall also be provided. Diagrams, calculations, and drawings shall be prepared under the supervision of a United States registered professional electrical engineer.

4.e.(2) Point of Connection:

4.e.(2).(a). **For Area J**, the primary electrical power to the project site may be obtained from an existing stubout that was installed under the FY99 FHNC 64 New Family Housing Replacement - Area I and J. See RFP Drawing No. 711-15-91, sheet CE-3. The duct section of this stubout is provided in Attachment, Duct Section - Primary Electrical, Telecommunications, and CATV (for Area J). **For Area U**, the primary electrical power to the project site may be obtained from an existing stubout that was installed under the FY98 FHNC 132 New Family Housing Replacement - Area U. See RFP Drawing No. 711-15-70, sheet CE-2. The duct section of this stubout is provided in Attachment, Duct Section - Primary Electrical, Telecommunications, and CATV (for Area U). Confirm selection of stubouts in Areas J and U with DPW. POC is Utilities Section, DPW, phone no. 655-6383. The Contractor is advised that an existing abandoned underground electrical and telecommunication ductline runs through the project site near Soloman School in Area U. This ductline runs from handhole HH0 to pole JP-U-27 and needs to be removed. See Attachment, Abandoned Ductline Removal - Soloman School/Area U.

4.e.(2).(b). The Contractor shall initiate requests for outages no less than 45 calendar days prior to any interruption of service in the existing electrical system. Written requests shall be forwarded to DPW via the contracting Officer. Switching shall be performed by DPW authorized personnel.

4.e.(3) System Design: Provide new electrical distribution system as necessary and connect to existing system. The distribution system shall be underground for both primary and secondary conductors. The primary system shall be a loop feed and shall be compatible with the system of which it becomes an extension. Primary conductors shall be in concrete encased thin-wall PVC ducts, routed through manholes. A minimum of one spare duct shall be provided. A three-way primary non-oil sectionalizing switches shall be provided for each transformer. The three-way switch shall re-establish service to all loads following any fault by isolating the faulted section of the loop feed circuit. Each sectionalizing switch shall switch all phases of the loop feed circuit. Buses for the three-way sectionalizing switches shall be fully insulated for 15kv. Locate sectionalizing switches in the immediate vicinity of its associated transformer. Handholes shall be provided adjacent to the sectionalizing switches to facilitate pulling of any future cables. Provide cable fault indicators at each sectionalizing switch. Cable fault indicators are not required for cables between the sectionalizing switch and transformer. Cable fault indicators shall be required on both sides of the sectionalizing switch for the main loop conductors. Tag all cables to identify phases. All electrical materials and equipment shall be rated for future operation at 12.47 kV, although the current operation shall be at 6.8 kV line-to-line. The existing nominal system is 7.2 kV, 3-phase, delta with grounding transformers at the substation. Design of the electrical power distribution system shall conform to the applicable requirements for the Department of the Army and the Directorate of Public Works (DPW) and in compliance with the rules and recommendations of IEEE/ANSI C2, National

Electrical Safety Code 1997 edition, and NFPA 70, National Electrical Code 1999 edition, and applicable local codes.

4.e.(4) Primary Cable: Primary cable shall be ethylene propylene rubber insulated, polyvinyl chloride jacketed, 25% copper tape shield overlap. Conductors shall be copper; sizes larger than no. 8 AWG shall be stranded. Cables shall have a voltage rating of at least 15 kV with 133 percent insulation level. Cable shall be #2, #4/0, or 250 kcmil standard sizes. Deviations from these sizes shall be coordinated and approved by Mr. Roger Grace, DPW, phone no. 655-2942, ext. 3011.

4.e.(5) Underground Splices: Splices shall be in a self-draining, rodent-resistant manholes with traffic rated covers. Primary cable shall be installed without splice in runs of 152 meters (500 ft) or less. "Y" and "T" splices shall not be used. The maximum spacing between manholes shall be 91 meters (300 ft). Primary cables shall be fire-proofed for their entire length within a manhole on an individual cable basis. Fireproofing shall extend at least 25 mm (1 in) into the ducts. Systems shall be listed as a fire protective coating for grouped electrical conductors and shall be suitable for application on the type of medium voltage cables provided. After fully cured, the installation shall be suitable for use where exposed to oil, water, gases, salt water, sewage, and fungus whereby no resulting damage to cable or insulation shall occur.

4.e.(6) Secondary Conductors: Secondary underground cables shall conform to UL 854 and shall be copper, type RHH-RHW-USE insulation, cross-linked polyethylene or ethylene-propylene-rubber outer covering. Conductors shall be installed in non-encased PVC thick wall ducts and where practical, located below sidewalks. Secondary cable splices shall be made in splice boxes approved for the purpose and in accordance with the manufacturer's recommendations.

4.e.(7) Service Entrance: Only one service entrance per building shall be provided.

4.e.(8) Transformers: Transformers shall be pad-mounted. Enclosed compartmental-type pad mounted transformers shall be mineral oil insulated and of dead-front construction. Transformers shall be rated for 7.2 kV. Two sets of primary fuses shall be provided. Transformers shall be provided with four 2-1/2 percent rated KVA, high-voltage taps, two above and two below rated primary voltage. The transformers shall be connected for phase-to-phase operation. Where secondary feeders exit transformer, provide tags to indicate building address numbers. Transformer pad shall be concrete. Transformers shall have "Danger High Voltage" signs affixed to all four sides of the transformer enclosure. All transformers shall be located a minimum of 7.6 meters (25 feet) from the overhanging eaves of buildings and shall be accessible to service personnel for maintenance operations. Transformers shall be located near the streets to facilitate maintenance. Area surrounding the pad-mounted transformer shall be appropriately landscaped to aesthetically blend the transformer into the neighborhood.

4.e.(8).(a) Transformers shall conform to the requirements of ANSI C57.12.25. Transformer enclosures shall be stainless steel. Transformers shall have all handhole covers, roof panels, compartment walls, doors, and sills made of 13 gauge (minimum) type 304L or type 304 low carbon (0.05% or less carbon content) stainless steel. The doors may be made of 400 CB stainless steel. The hinges, hinge pins, door locking/latching/operating mechanisms and cooling tubes or fins shall also be type 304L or type 304 low carbon (0.05% or less carbon content) stainless steel. These transformers shall be identified by the addition of words "stainless steel enclosure" to the nameplate. Transformers shall be provided with corrosion-resistant finishes which shall withstand 500 hours of exposure to the salt spray test specified in ASTM B 117 without loss of paint or release of adhesion of the paint primer coat to the metal surface in excess of 2 mm (1/16 inch) from the test mark. The scribed test mark and test evaluation shall comply with ASTM D 1654 with a rating of not less than 178 mm (7 in) accordance with Table 1, (procedure A). Cut edges or damaged surfaces shall be coated with a zinc rich paint.

4.e.(8).(b) The dielectric of each transformer shall have less than 50 parts per million (ppm) PCB content. If the dielectric exceeds the 50 ppm PCB content, the transformer shall be considered PCB insulated, and will not be acceptable.

4.e.(8).(c) Transformers shall be provided with, each having a manufacturer's nameplate permanently marked and mounted, which states that the dielectric is non-PCB classified with less than 50 ppm PCB content.

4.e.(8).(d) Primary protection shall include high voltage drawout loadbreak current limiting fuses, and medium-voltage separable connectors (loadbreak elbows & bushings). Loadbreak current limiting fuse shall be provided in the switch's transformer connecting poles. Primary tap changers shall be located within high-voltage compartments with the tap changer handle located external to the transformer tanks. Fuses shall be sized approximately 150 percent of the transformer full load current rating. Three sets of spare fuses shall be provided to DPW. Design shall ensure that the estimated peak demand on each transformer shall not exceed its rated capacity.

4.e.(8).(e) Loads on the primary system shall be distributed evenly on the three electrical phases. A multiple grounded neutral conductor shall be routed with the phase conductors.

4.e.(8).(f) The length of secondary distribution service laterals from the transformer secondary to building service entrances shall be minimized. The voltage drop from the transformer to each building service entrance equipment shall not exceed 3%. The voltage drop from the service entrance equipment to the farthest outlet of lighting, power, or combination of such loads shall not exceed 5%.

4.e.(8).(g) Enclosures from transformers, sectionalizing switches and master meters shall be factory applied Norwood Brown color, Federal Color No. 10045 to match existing enclosures.

4.e.(8).(h) A separate demand load calculation shall be provided for each type of individual housing unit (per NEC ART. 220). Include catalog cuts of the electrical data for the HVAC equipment that was selected by the mechanical engineer. First, calculate the demand load for each pad-mounted distribution transformer by adding the demand loads (minus the HVAC load) for each type of housing unit connected to the transformer. Second, multiply this load by the appropriate demand factor found shown in the table below. Third, add the HVAC load and site lighting loads to this figure to arrive at the transformer demand load. Calculate the demand load for each phase of each circuit of the primary distribution system in the same manner. Provide a load summary table indicating each type of demand load calculated. Transformers shall be sized to limit the amps interrupting current (AIC) to 10,000 at each housing unit, without the use of low voltage cable limiters. Maximum transformer rating shall be 100 kVA.

Number Demand of Quarters	Demand Factor Percent	Number Demand of Quarters	Demand Factor Percent	Number Demand of Quarters	Demand Factor Percent
1	80.0	19	18.0	37	13.2
2	60.0	20	17.5	38	13.0
3	50.0	21	17.1	39	12.8
4	45.0	22	16.6	40	12.6
5	40.0	23	16.1	41	12.4
6	35.0	24	15.8	42	12.2
7	32.0	25	15.6	43	12.0
8	29.0	26	15.4	44	11.8
9	27.0	27	15.2	45	11.6
10	25.0	28	15.0	46	11.4
11	24.0	29	14.8	47	11.2
12	23.0	30	14.6	48	11.0
13	22.0	31	14.4	49	10.8
14	21.0	32	14.2	50	10.6
15	20.0	33	14.0	51	10.4
16	19.4	34	13.8	52	10.4
17	18.7	35	13.6	53	10.1
18	18.3	36	13.4	54	10.0

4.e.(9) Street/Area Lighting. Residential roadway lighting including collector streets shall be provided with 250-watt high pressure sodium (HPS) lights at each roadway intersection and 100-watt HPS lights at intervals not exceeding 52 m (170 ft) between intersections. Area lighting shall be provided at intervals not exceeding 52 m (170 ft) along area walkways not otherwise illuminated, common area walks connecting picnic areas, and at all steps in area walkways. Area lighting shall be provided with HPS lights. Illumination levels and uniformity ratios shall be in accordance with the IES Lighting Handbook. Luminaries shall be actuated by photoelectric control, one photocell per circuit, and supplied from multiple circuits originating from a circuit breaker mounted at the pad-mounted transformer. Light fixtures shall have vandal-resistant polycarbonate type lens and shall be mounted on seamless aluminum poles. Lights, poles, and anchoring shall be designed to withstand a wind loading of 100 MPH.

4.e.(10) Electrical Metering: Master meters are required to monitor consumption of electricity by housing areas. Master meters shall be compatible with the existing metering system used on Base.

4.e.(11) Operation and Maintenance (O & M) Manuals: Operation and Maintenance manuals shall be provided for the sectionalizing switches and the transformers. Manuals shall include instructions for assembly, installation, operation and maintenance, and spare parts data which provides supplier name, current cost, catalog order number, and a recommended list of spare parts to be stocked. Manuals shall also include data outlining detailed procedures for system startup and operation, and a troubleshooting guide which lists possible operational problems and corrective action to be taken. A brief description of all equipment, basic operating features, and routine maintenance requirements shall be included. Documents shall be bound in a binder marked or identified on the spine and front cover. A table of contents page shall be included and marked with pertinent contract information and contents of the manual. Tabs shall be provided to separate different types of documents, such as catalog ordering information, drawings, instructions, and spare parts data. Index sheets shall be provided for each section of the manual when warranted by the quantity of documents included under separate tabs or dividers. Six copies of these O & M manuals shall be submitted within 7 calendar days following the completion of tests.

4.e.(12) Telecommunications Distribution System:

4.e. (12). (a) Point of connection: **For Area J**, the point of connection shall be from an existing stubout that was installed under the FY99 FHNC 64 New Family Housing Replacement - Areas I and J. See RFP Drawing No. 711-1591, sheet CE-3. The duct section of this stubout is provided in Attachment, Duct Section - Primary Electrical, Telecommunications, and CATV (for Area J). **For Area U**, the point of connection shall be from an existing stubout that was installed under the FY98 FHNC 132 New Family Housing Replacement - Area U. See RFP Drawing No. 711-15-70, sheet CE-2. The duct section of this stubout is provided in Attachment, Duct Section - Primary Electrical, Telecommunications, and CATV (for Area U). Confirm selection of stubouts in Areas J and U with DOIM. POC for DOIM is Mr. Herb Awaya, phone no. 438-4973. As stated in paragraph 4.e.(2), the Contractor is advised that an existing abandoned underground ductline runs through the project site near Soloman School in Area U. This abandoned ductline needs to be removed from HH0 to pole JP-U-27. See Attachment, Abandoned Ductline Removal - Soloman School/Area U.

4.e.(12).(b) The telecommunications cable and duct distribution shall be underground within the project site. The telecommunications distribution system shall be physically separated from the electrical power distribution system in accordance with the NESC. Exterior telecommunication cables shall be furnished and installed by others. The Contractor shall coordinate with DOIM's Enterprise Management Center, Mr. Herb Awaya, telephone number 438-4973. All proposals, design, and installation requirements shall be coordinated through the DOIM to ensure Federal and local telecommunications standards are met at the sole expense of the Contractor.

4.e.(12).(c) The Contractor shall be responsible for coordinating with DOIM to ensure what is proposed meets Federal and local PUC requirements. If any requirements are not met, the Contractor shall provide what is required at no increase to the Contract price or time of performance.

4.e.(12).(d) The Contractor is cautioned that DOIM requires drawings to be submitted which show, at a minimum, locations, routes, types, and sizes of the supporting facilities for the telecommunications

system. The Contractor is also advised that DOIM and the commercial vendor may decline to review drawings which it considers inadequate in detail.

4.e.(12).(e) ANSI/TIA/EIA 569A Commercial Building Standard for Telecommunications Pathways and Spaces shall be used for manhole, handhole and ductline design. The underground telecommunication system design must also conform to Verizon "Standard Specifications for Placing Underground Telephone System". Federal standards shall be the minimum requirement. Commercial vendor products may be used, if they meet or exceed the Federal Standards.

4.e.(12).(f) In addition to the requirements stated above, the following shall be provided as a minimum:

4.e.(12).(f).1/ Details of conduit termination to commercial lines on an existing pole or manhole at the point of connection (aerial to underground or underground to underground).

4.e.(12).(f).2/ Deleted

4.e.(12).(f).3/. Sizes, quantities, type, and locations of pullboxes, handholes, manholes and ducts with Mule tape.

4.e.(12).(f).4/. Sizes and types of terminal cabinets required at each building. A termite treated backboard and an insulated copper, #6 AWG, ground conductor shall be provided in each cabinet. The ground conductor shall be connected to an ANSI/TIA/EIA compliant busbar in each cabinet. Telecommunications grounding shall meet TIA/EIA-607-1995. Cabinet enclosures shall be rated NEMA 3R.

4.e.(12).(f).5/ Quantities of telecommunications circuits. A minimum of two telecommunications circuits shall be installed to serve each family housing unit.

4.e.(12).(f).6/ Minimum duct size for distribution lines shall be 102 mm (4 inches). Ducts shall be PVC Schedule 40 when concrete encased and Schedule 80 when direct buried. If practicable, locate below the sidewalks. The 102 mm (4 inch) ducts shall enter and leave the pullbox from the short side of the box. Burial depth shall be 600 mm (24 inches) measured from the top of the duct. At least one spare 102 mm (4-inch) duct shall be provided for each distribution line. Mule tape shall be provided in each duct. See other paragraphs for burial depth and concrete encasement requirements.

4.e.(12).(f).7/ Manholes shall be equipped with two pulling-in iron and cable racks with arms. Maximum spacing for manholes shall be 152 m (500 feet). Maximum spacing between handholes/pullboxes and between handholes/pullboxes and buildings shall be 45.5 m (150 feet). All manholes, handholes, and pullboxes shall be provided with 2400 mm (8 foot) ground rods. All handholes/pullboxes shall be located in sidewalks and all manholes shall be located in roadways.

4.e.(12).(f).8/ Minimum duct size to the building shall be 51 mm (2 inches). Verizon requires 1-53 mm (2 inch) conduit to each building. Ducts shall be PVC Schedule 40 when concrete encased and schedule 80 when direct buried.

4.e.(12).(f).9/ All inside cabling shall be identified and tagged at the terminal and the outlet in accordance with ANSI/TIA/EIA 606-1994 with the following minimum information: a) units numeric/alpha address, b). room and outlet designation.

4.e.(12).(f).10/ The Contractor is required to follow Federal and PUC technical guidance as part of this project. Any deviations shall be coordinated through the DOIM with the local service provider. Point of contact at DOIM is Mr. Herb Awaya, (808)438-4973.

4.e.(13) Television Distribution System: Space provisions (empty conduits) shall be made, for installation of an underground television cable system. Cables will be furnished and installed by others. Mule tape shall be provided in all empty conduits to facilitate pulling of cables by others. The underground cable television distribution system shall be physically separated from the electrical

distribution system in accordance with NESC (ANSI C2). All design and installation requirements shall be coordinated with Oceanic Cable at the sole expense of the Contractor.

4.e.(13).(a). Point of connection: **For Area J**, the point of connection for the cable TV system shall be from an existing stubout that was installed under the FY99 FHNC 64 New Family Housing Replacement - Area I and J. See RFP Drawing No. 711-15-91, sheet CE-3. The duct section of this stubout is provided in Attachment, Duct Section - Primary Electrical, Telecommunication, and CATV (for Area J). **For Area U**, the point of connection for the cable TV system shall be from an existing stubout that was installed under the FY 98 FHNC 132 New Family Housing Replacement - Area U. See RFP Drawing No. 711-15-70, sheet CE-2. The duct section of this stubout is provided in Attachment, Duct Section - Primary Electrical, Telecommunication, and CATV (for Area U). Confirm selection of stubouts in Areas J and U with DOIM. POC for DOIM is Mr. Herb Awaya, 438-4973. As stated in paragraph 4.e.(2), the Contractor is advised that an existing abandoned underground ductline runs through the project site near Soloman School in Area U. This ductline needs to be removed. See Attachment, Abandoned Ductline Removal - Soloman School/Area U.

4.e.(13).(b). The Contractor is cautioned that Oceanic Cable requires drawings to be submitted which show, at a minimum, locations, routes, types, and sizes of the supporting facilities for the television system. The Contractor is also advised that Oceanic Cable may decline to review drawings which it considers inadequate in detail.

4.e.(13).(c). The Contractor is advised that Oceanic Cable has standard drawings for the pull boxes, manholes, handholes, and ductlines. The Contractor may contact Oceanic Cable regarding their standard specifications. The point of contact is Mr. Dean Yonezawa, Oceanic Cable, phone number (808) 625-8456.

4.e.(13).(d). The Contractor shall coordinate with Oceanic Cable to ensure what is proposed meets all of that company's requirements. If any requirements are not met, the Contractor shall provide what is required at no increase to the Contract price or time of performance.

4.e.(13).(e). The Contractor must provide 1 week notice before conduit installation begins. Point of contact shall be Mr. Roy Enomoto, Oceanic Cable, phone number (808) 625-8372.

4.e.(13).(f). In addition to the requirements stated above, the following shall be provided for Oceanic Cable's approval.

4.e.(13).(f).1/ Details of conduit termination to Oceanic Cable lines on an existing pole or manhole at the point of connection (aerial to underground or underground to underground).

4.e.(13).(f).2/ Sizes, quantities, type, and locations of pullboxes, handholes, manholes, and ducts with mule tape. May include power supply with secondary as needed.

4.e.(13).(f).3/ Sizes and types of terminal cabinets required at each building. A termite treated backboard and insulated copper, #6 AWG, ground conductor shall be provided in each cabinet. The ground conductor, with 900 mm (3-feet) excess length in each cabinet, shall be connected to the building grounding system. Cabinet enclosures shall be rated NEMA 3R.

4.e.(13).(f).4/ Quantity of television outlets.

4.e.(13).(f).5/ Minimum duct size for distribution lines shall be 102 mm (4 inches). Ducts shall be PVC schedule 40 when concrete encased and when direct buried. If practicable, locate below the sidewalks. Burial depth shall be 600 mm (24 inches). Mule tape shall be provided in each duct. See other paragraphs for burial depth and concrete encasement requirements.

4.e.(13).(f).6/ Maximum spacing of pullboxes/handholes shall be 108 m (350 feet). All handholes/pullboxes shall be located in sidewalks and/or planter strips. Maximum distance for CATV service drop cables shall not exceed 150 ft from the Building's terminal cabinet to the pullbox

containing the main CATV distribution cables. Exceptions to this requirement will require approval from Oceanic Cable.

4.e.(13).(f).7/ Minimum duct size to the building shall be 53 mm (2 inches). Ducts shall be PVC Schedule 40 when concrete encased and when direct buried. Mule tape shall be provided in each empty duct.

4.e.(13).(f).8/ All inside wiring shall be identified and tagged with the units numeric/alpha address. All inside wiring shall be homerun to the junction box.

4.e.(13).(f).9/ Where applicable, sizes and locations of power supply pullbox shall be as recommended by Oceanic Cable. Power supply, box, pad, and pedestal shall be provided by Oceanic Cable. See RFP drawing "INSTALLATION DETAIL - LECTRO POWER SUPPLY".

4.e.(13).(f).10 As shown in Attachment, CATV Requirements for Area I and J and Attachment, CATV Requirements for Area U and W.

4.e.(13).(g). Pullboxes: A 600 mm (24 inch) by 1200 mm(48 inch) CATV pullboxes shall be used for this project. See RFP drawing "24 IN x 48 IN PULLBOX DETAIL". Pullboxes shall be precast concrete with with polymer non-skid surfaced two piece covers inscribed with "TV". A minimum of two precast concrete pullbox sections shall be required at each pullbox.

4.e.(13).(h). Terminal Cabinets. Terminal cabinets shall be provided. Incoming ducts to the building main terminal cabinet shall be 53 mm (2-inch) PVC schedule 40 when concrete encased and when direct buried.

4.e.(14). Plastic Marking Tape. Warning tapes shall be installed directly above the utility line at a depth of 300 mm (12 inches) below finish grade unless otherwise shown. Plastic marking tape shall be acid and alkali-resistant polyethylene film, 75 mm (3-inch) minimum wide with a minimum thickness of 4 mils, minimum strength of 12,066 kpa (1750 psi) lengthwise, and 10,342 kpa (1500 psi) crosswise. Preferred tape shall be manufactured to enable detection by a metal detector when tape is buried up to 900 mm (3 feet) deep. Tape color shall be as specified in the following table and shall bear a continuous printed inscription describing the specified utility.

<u>Utility</u>	<u>Tape Color</u>	<u>Color</u>
Electric		Red
Telephone, Television		Orange
Water Systems		Blue
Sewer Systems		Green

4.e.(15) Special Utilities and Supplementary Construction. The Contractor shall be responsible for obtaining all required City and County of Honolulu and State of Hawaii permits. Required connections to the existing utilities shall be completed by the Contractor at no increase to the Contract price even if they are beyond the indicated project boundaries. The Contractor shall coordinate the installation of telephone and cable TV feeders from the points of connection to the buildings with DOIM, Oceanic Cable, and GTE Media Ventures, respectively. Connection, pulling, and installation of wire will be done by the respective utility company. The cost of pulling, installation, and connection shall be included in the Contractor's proposal.

4.e.(16) Relocation of Existing Structures: If any existing structures require relocation/replacement due to the development of the housing sites, the relocation/replacement costs shall be included in the Contractor's proposal. The Contractor shall replace the existing with new equivalent materials, ratings, and capacities which meet the requirements of DOIM, Oceanic Cable and the Government.

4.e.(17) Cathodic Protection: Cathodic Protection (CP) is mandatory on buried ferrous metallic structures as described below:

4.e.(17).(a) CP systems must be designed to provide protective potential to meet the requirements of the National Association of Corrosion Engineers (NACE) Standard RP-0169, Control of External Corrosion on Underground or Submerged Metallic Piping Systems, or NACE Standard RP-0185, Control of External Corrosion on Metallic Buried, Partially Buried, or Submerged Liquid Storage Systems as appropriate.

4.e.(17).(b) CP and protective coatings shall be provided for the following buried/submerged ferrous metallic structures regardless of soil or water resistivity:

4.e.(17).(b).1/ Natural gas and propane piping

4.e.(17).(b). 2/ Fire protection piping.

4.e.(17).(b). 3/ Other structures with hazardous products as identified by the user.

4.e.(17).(c) Cast iron pipe shall be treated as follows:

4.e.(17).(c).1/ For soil resistivity below 10,000 ohm-cm at pipeline installation depth, provide CP, bonded joints, and protective coatings.

4.e.(17).(c).2/ For soil resistivity between 10,000 and 30,000 ohm-cm at pipeline installation depth, provide bonded joints only.

4.e.(17).(d) Copper water service lines will be dielectrically isolated from ferrous pipe. Dielectric isolation shall conform with NACE RP-0286.

4.e.(17).(e) For ductile iron piping systems (except for ductile iron piping under floor in soil) conduct an analysis to determine if CP and/or bonded or unbonded coatings are required. Unbonded coatings are defined in ANSI/AWWA C105/A21.5.

4.e.(17).(f) The Contractor shall conduct and provide an economic analysis to determine if CP and protective coatings should be provided for gravity sewer lines and the following structures in soil resistivity conditions above 10,000 ohm-cm:

4.e.(17).(f).1/ Potable water lines

4.e.(17).(f).2/ Concentric neutral cable

4.e.(17).(f).3/ Other buried/submerged ferrous metallic structures not covered above.

4.e.(17).(g) Ferrous metallic piping passing through concrete shall not be in contact with the concrete.

4.e.(18) Coordination: The Contractor shall coordinate all work with the Contracting Officer to minimize interruption and inconvenience to the occupants of existing facilities or to the Government. Scheduling and programming of work will be established during the pre-construction conference.

4.e.(19) Utilities and Facilities: All utilities and facilities shall remain operable and shall not be affected by the Contractor's work unless otherwise approved in writing in advance by the Contracting Officer. Temporary power/telecommunication/cable television/street lighting circuits and/or engine generators shall be provided where required to keep the facilities operable. When outages are required, they shall be coordinated with the Contracting Officer.

5. UNIT DESIGN - ARCHITECTURE.

5.a. Unit Design. Unit design shall be within the net areas authorized for the various type of units specified. Public Law 97-214, Title 10 USC, Section 2826, establishes net area limitations for military family housing. The law permits a 5 percent maximum increase in these limitations if such a modification will permit a turnkey offer of "off-the-shelf" designs currently being constructed in the commercial marketplace. Statutory floor area limitations for living units are as listed Table 5-1 with allowable area variations. Offerors should note that technical proposals do not receive higher appraisals for simply offering more net floor area for units, nor are proposals scored lower if the net floor area offered are less than the maximum net floor area permitted by law (but still within the 2% deviation permitted). Proposals that offer net floor areas for units that deviate more than 2% minimum or 5% maximum than the statutory maximum net floor areas shall be considered deficient and shall be scored appropriately.

TABLE 5-1 - SIZE OF FAMILY HOUSING UNITS BY PAY GRADE

Pay Grade	Number of FH Units	Number of Bedrooms	Net Floor Area					
			-2% Min. (DA)		Basic (Statutory Limit)		+5% Max. (Turnkey)	
			m ²	ft ²	m ²	ft ²	m ²	ft ²
O1-O3 (CGO)	29	4	132	1,421	135	1,450	142	1,523
E1-E6 (JNCO)	21	3	109	1,176	112	1,200	117	1,260
E1-E6 (JNCO)	20	4	123	1,323	125	1,350	132	1,419

Total FHU Units: 70

5.a.(1) Net area definition. Net area is defined as the space inside the exterior and party walls. Net area excludes:

5.a.(1).(a) Exterior and party walls.

5.a.(1).(b) Half thickness of interior walls adjacent to excluded areas.

5.a.(1).(c) Utility and laundry rooms.

5.a.(1).(d) Interior and exterior bulk storage.

5.a.(1).(e) Washer and dryer closet (not to exceed 2.8 m² (30 ft²)).

5.a.(1).(f) Domestic water heater, and solar equipment spaces.

5.a.(1).(g) Stairwells. Stair landing at each floor level above the first floor (not to exceed .93 m² (10 ft²) per floor).

5.a.(1).(h) Finished space under stairs with headroom less than 1372 mm (4 feet 6 inches); Common stairways; The area of stairways and intermediate landings between each floor.

5.a.(1).(i) Walls and interior spaces specifically designed for passive solar systems (other than required habitable areas).

5.a.(1).(j) Unfinished attic space.

5.a.(1).(k) Patios and porches.

5.a.(1).(l) Garages, garage storage.

5.a.(1).(m) Increases required to meet accessibility standards.

5.a.(1).(n) Open or screened porches without heating, air conditioning, or interior-type finishes. In localities subject to adverse weather conditions, such as wind-driven mist or noxious atmosphere, or both, open porches may be enclosed with appropriate fenestration or screening, or both, and not considered to increase the net area of the living units, provided that air conditioning or heating, or both, is not added and the basic character of the enclosed area is still that of a porch.

(Note to Offeror : Offerors desiring to submit designs, which they are currently offering in the commercial marketplace and which may exceed the basic net floor areas set forth herein, may do so provided the net areas of these designs do not exceed the corresponding maximum net floor areas listed. Designs, which provide less than the minimum or greater than the maximum net square feet indicated, are not acceptable. Net area calculations shall be provided on Attachment FORMAT OF REQUIRED CALCULATIONS and drawing should include a graphic net area calculations to show the methodology by which you arrived at the net floor areas of each dwelling unit. Any reference to the work "proposer(s)" shall be revised to "offerors"

5.a.(2) Type of Housing by Rank:

<u>Rank (Br Type)</u>	<u>Acceptable Types</u>
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<u>Areas "I" & "J"</u>	
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CGO	4-BR (1), (2)
JNCO	4-BR (1), (2)
JNCO	3-BR (1), (2)

(1) Townhouse-type structures: A maximum of six (6) family housing units per building.

(2) Duplexes. Duplexes are preferred over townhouse-type structures.

5.a.(2).(a) Accessible units. All disabled identified units shall fully comply with accessible/adaptable requirements for people with disabilities, with the exception of the kitchen appliances. In all disabled identified units, the vertical, horizontal and turning clearance dimension shall be in compliance with UFAS requirements. This means required access clearances, room sizes, bathroom layout (with blocking for grab bars), kitchen layout, work surfaces, countertops, sinks, base cabinets kitchen storage cabinets, hallways, walkways, doors (hardware), plumbing hookups, light switches and outlets, controls, and warning devices must meet UFAS requirements at time of construction. Standard appliances shall be provided for able-bodied people, but should be readily modifiable for disabled personnel. Kitchen appliances such as ranges, ovens, cooktops, controls, are to be installed for standard use, but shall be designed to be readily modified to accommodate the disabled person as the need arise. Drawings shall clearly indicate all disabled and modified items. Structural strength of grab bars, tub and shower seats, fasteners, and mounting devices shall meet the Federal Register specifications of 250 lbf for bending, shear, tensile force and lateral load.

Modifiable/adaptable means a reasonable effort to be expended to convert an existing facility into full compliance with accessibility requirements for people with disabilities. This effort is herein defined to be 10 man-days of labor per dwelling unit for the installation of improvements, equipment, and new materials (one week for a 2 man crew). Requirements shall be in accordance with the Uniform Federal Accessibility Standards (UFAS) and Americans with Disability Act Accessibility Guidelines (ADAAG). If there is a conflict between the two, then the more stringent one will govern.

5.a.(2).(b) The following are references for disabled requirements:

Item	RFP Paragraph No.
Driveway Slope	3. f. (9)
Sidewalk Ramps	3. f. (8)
Bathrooms Fully Accessible	5. a. (2) (a)
Bathroom Plumbing, Shower Controls, Fixtures, Light Switch, And Thermostat	5. h. (1) (f)
Grab Bars At Showers, Bath Tubs, And Water Closet	5. a. (2) (a)
Vanity Accessibility At Bath Room	5. h. (1) (b)
Mirror, Canting	5. h. (1) (c) <u>1</u> /
Horizontal Clearance At Garage	5. j. (1) (a)
Automatic Garage Door Opener	5. j. (1) (a)
Dimensional Tolerances/Precedence	5. a. (2) (a)
Stoop Level Change	5. a. (2) (a)
Hardware - Lever Door Handles	5. q. (1) (c)
Peep Hole, Slanting	5. q. (4) (b)
Plumbing Fixtures And Controls	5. a. (2) (a)
Water Closet Height	5. a. (2) (a)
Lavatories Installation	5. a. (2) (a)
Counter Height	5. s. (2)
Door Chimes	5. t.
Screen Door	5. p. (4)
Shower Spray	8. c (1) (a)
Wall Light Switch Height	5. h.(1)(f)
Range/Refrigerator/Freezer Type	5. x.(1),(2)
Patio Access	5. l. (11)
Fence Gates	5. l. (13)
Single Handles For Water Supply In Bathrooms	8. c (1) (a)

Quantity of disabled dwelling units designed to be readily modified and/or fully accessible shall be as follows:

Areas "I" and "J": Two (2) CGO four-bedroom units, one (1) JNCO four-bedroom unit, and one (1) JNCO three-bedroom unit.

5.b. Functionality. Rooms shall be sized and arranged for efficient use, good circulation and furniture placement. The distribution of space for food preparation living/dining, sleeping, bathing, halls, closets, and services should be balanced and should enhance the intended functions.

5.b.(1) Habitable rooms shall not be used as halls for entry into a unit or for primary circulation within a unit.

5.b.(2) Provide convenient access between garage and service area and between kitchen and service area.

5.b.(3) Do not use a sliding glass door as a primary unit access.

5.b.(4) It is mandatory that plans do not use habitable rooms for primary circulation within the unit. Circulation to the patio through the family room, living room, or kitchen is acceptable (definition of habitable & nonhabitable: refer to UBC, Sec. 209). Circulation space within a unit shall be deducted from the usable area of habitable rooms. The deductible circulation within a space should be a minimum of 1000 mm (3'-3") clear width.

5.b.(5) Convenient access shall be provided between kitchen and dining area.

5.b.(6) Family Housing Unit Variation: Family housing unit variations shall afford distinctly different exterior appearances within each family housing unit type. Prefer wider integration on individual street, i.e. a wider selection of dwelling unit types (3,4 bedroom unit, disable units, etc.) on any one individual street so as not to concentrate on just one type of unit. Houses on any street or cul-de-sac should have a mixture of unit types. Family housing units shall vary in two or more of the following: floor plans, massing, elevation, and garage location. One floor plan for each family housing unit type is acceptable if sufficient variety is achieved by means of other variations mentioned above. In addition, family housing units shall vary in color and siting. A reverse floor plan (mirror-image), although an acceptable means of creating variety, shall not constitute a family housing unit change. Offerors shall comply with land-use restraints set forth. However, to accept the design freedom objective of this RFP, Offerors are encouraged to offer one-story and two-story construction for family housing units. In townhouse construction an attempt shall be made to vary surface planes or facades to avoid monotony.

5.b.(7) The utility room shall be located near or adjacent to the kitchen.

5.b.(8) Front door entrances to each family housing unit shall be protected from weather.

5.b.(9) Each bedroom shall have an outside window that has a clear opening sufficient to permit evacuation of the occupants and that can be easily opened from the inside.

5.b.(10) Furnishability. All rooms should be designed to have adequate wall space for normal furniture placement without having doors, windows or traffic affecting usability of walls.

5.c. Indoor/Outdoor Integration. Emphasize factors that enhance indoor/outdoor living. Consider size, layout and location of patios, and yards, and features that encourage family use of outdoor area.

5.d. Fire Protection and Safety. Family housing will comply with the current applicable National Fire Codes, including NFPA 101, Life Safety Code. Construction features will be provided in accordance with the Building Code of the City & County of Honolulu (HUBC).

5.d.(1) Fire Resistance/Sprinkler. Party walls separating dwelling units, which are installed side by side (townhouse) shall be constructed as minimum two-hour fire rated walls and extend from foundation to roof sheathing. Two-hour Area Separation Walls shall be installed as a minimum between each group of two dwelling units in accordance with HUBC, 504.6. In the event the area separation wall is terminated at the underside of the roof (HUBC 504.6.4, Exception 2.1 & 2.2), the one-hour fire-resistive construction requirement shall be a minimum of two layers of 16 mm (5/8 inch) Type X gypsum board. Other equivalent listed materials or listed assemblies can be used subject to the approval of the Contracting Officer. Area separation walls must be continued through the floor and be either the same two-hour fire-resistive construction or equivalent construction subject to approval of the Contracting Officer. Party walls separating dwelling units, which are stacked vertically (apartment) shall have a fire resistance rating of one hour minimum. One-hour party walls shall be provided

between dwelling units in duplex buildings. All apartments shall be provided with a supervised sprinkler system throughout. Provide Class A ASTM E 108 roof covering material throughout.

5.d.(1).(a) Each attached dwelling unit garage shall be separated from the dwelling unit by a one hour minimum occupancy separation wall.

5.d.(1).(b) Fireblocks and Draft stops, in accordance with the Building Code of the City and County of Honolulu, Section 708 shall be provided.

5.d.(2) Fire retardant treated plywood shall not be used.

5.d.(3) Alarm systems.

5.d.(3).(a) When a general building alarm system is required by NFPA 101, such as those required for housing units four stories or higher, the required systems shall transmit alarms to the Federal Fire Department, Pearl Harbor. Exceptions, when approved by the Contracting Officer, shall be granted for housing units not located on military installations and for units located on installations without a base-wide or central fire reporting system.

5.d.(3).(b) Smoke detectors: See section 9, Electrical, paragraph 9.i.

5.e. Sound Attenuation.

5.e.(1) Testing. Certified proof-of-performance field tests will be conducted to demonstrate that the floor and wall systems as constructed provide the required sound isolation. Tests for air-borne sound shall be made in compliance with ASTM E336. Tests for impact sound shall be made in compliance with ASTM E1007. Testing of 10 percent (minimum) of each type of floor and wall system is required. Location of test sites will be chosen at random by the Contracting Officer.

5.e.(1).(a) Any wall or floor system found to be inadequate shall have the deficiencies corrected and the additional qualifying tests conducted at the contractor's expense. Testing at the contractor's expense of greater than 10 percent of each system may be required if the Contracting Officer determines that the quality of construction requires this additional testing.

5.e.(2) Party walls and party floors (floor/ceiling construction between dwelling units) shall be designed to provide the minimum airborne sound transmission ratings and impact isolation ratings stated in Table 5-2.

**TABLE 5-2 - SOUND TRANSMISSION STANDARDS
FOR PARTY WALLS AND PARTY FLOOR CONSTRUCTION**

Area	FSTC ¹	FIIC ²
Party Walls	52	N/A
Party Floors at Primary Habitable Areas (Living, Dining, Family Room, Bedrooms)	52	65
Party Floors at Wet Areas (Kitchen, Bath, Utility, Laundry, Equipment)	52	57
Habitable Areas Over Garages	52	N/A

Note¹: Field Sound Transmission Class. See ASTM E336.

Note²: Field Impact Isolation Class. See ASTM E1007.

5.e.(3) Floor construction. Party floors shall be designed to provide the minimum FSTC and FIIC ratings stated in Table 5-2. Materials used to obtain the required sound attenuation for the floor construction shall not be liquid-soluble or softened by moisture. Sound insulation shall have a flame-spread rating of 25 or

less and a smoke development rating of 50 or less when tested in accordance with ASTM E84. A vapor barrier shall be provided on the warm side of exterior and ceiling insulation for thermal insulation.

5.e.(4) Insulation. Insulation shall be provided to meet the following requirements:

Thermal and sound insulation shall have a flame spread rating of 25 or less and a smoke development rating of 50 or less exclusive of the vapor barrier when tested in accordance with ASTM E 84. A vapor barrier shall be provided on the warm side of exterior and ceiling insulation for thermal insulation.

5.e.(5) Plumbing and HVAC equipment. Design of plumbing and Heating, Ventilating, Air-Conditioning, and Dehumidifying (HVAC) equipment shall include design provisions such as location, enclosure and acoustical treatment, to minimize transmission of noise generated by equipment within each housing unit and to eliminate transmission of noise to other housing units.

5.e.(6) Urethane is not allowed as an insulation material.

5.f. Dimensions and Areas. Minimum dimensions and areas for interior spaces are shown in Table 5-3. Minimum dimensions and areas for exterior spaces are shown in Table 5-4.

TABLE 5-3 - MINIMUM AREAS AND DIMENSIONS - INTERIOR SPACES

Space	Area		Length		Width/Depth		Height ¹	
	m ²	ft ²	mm	ft-in	mm	ft-in	mm	ft-in
Living ²	14.0	150	3650	12	3650	12	2450	8-0
Dining (3 BR) ²	9.3	100	2900	9-6	2900	9-6	2450	8-0
Dining (4 BR) ²	10.2	110	3200	10-6	3200	10-6	2450	8-0
Family Room ²	8.4	90	2900	9-6	2900	9-6	2450	8-0
Kitchen ^{3,6}	6.0	64	2450	8-0	2450	8-0	2450	8-0
Eating in Kitchen ⁴	6.7	72	2600	8-6	2600	8-6	2450	8-0
Refrigerator & Freezer	0.5	6	900	3-0	600	2-0	1800	5-11
Washer/Dryer ⁵	1.6	17	1800	6-0	900	3-0	2300	7-6
BR #1	14.0	150	3550	11-8	3550	11-8	2450	8-0
BR #2	11.1	120	3000	10-0	3000	10-0	2450	8-0
BR #3	9.0	100	3000	10-0	3000	10-0	2450	8-0
BR #4	8.4	90	2900	9-6	2900	9-6	2450	8-0
Half Bath ⁶	-	-	-	-	900	3-0	2450	8-0
Full Bath ⁶	-	-	-	-	1500	5-0	2450	8-0
Vestibule	1.2	13	1000	3-3	1200	4-0	2300	7-6
Hall & Stairway ⁷	-	-	-	-	1000	3-3	2300	7-6

Note¹: Ceiling heights in habitable rooms shall be a minimum of 2450 mm (8'- 0). Ceiling heights can be reduced in parts of these rooms to 2300 mm (7'- 6") to accommodate ducts, fans, light fixtures, etc.

Note²: Room dimensions are exclusive of circulation. Circulation paths along one side of a room are permitted but add 1000 mm (3 ft-3 in) to the minimum dimension. 1828 mm (6 ft-0 in) exterior sliding glass door shall be provided.

Note³: A minimum of 1200 mm (4 ft-0 in) must be maintained in front of and between cabinets.

Note⁴: Minimum area/dimensions are measured from face of cabinets to walls.

Note⁵: Minimum area/dimensions are indicated for a washer/dryer closet. This area may also be provided in a utility room. When so provided area/dimensions are exclusive of circulation, opening width at utility and storage rooms is 864 mm (2 ft-10 ins.) min.

Note⁶: Accessible units must conform to UFAS. UFAS requires greater minimum dimensions. Shower curtain rod and shower arm connection ht. 1981mm (6 ft-6 ins).

Note⁷: Clear width is measured between railings. Riser 178 mm (7-inch) (max) and 279 mm (11-inch) tread (min).

TABLE 5-4 - MINIMUM AREAS AND DIMENSIONS - EXTERIOR SPACES

Spaces	Area		Length		Width/Depth		Height ¹	
	m ²	ft ²	mm	ft-in	mm	ft-in	mm	ft-in
Garage	21.6	240	3650	12-0	6700	22-0	2300	7-6
Patio - 3 BR	13.6	144	-	-	3000	10-0	2400	7-6
Patio - 4 BR	17.0	180	-	-	3000	10-0	2400	7-6

Note¹: Ceiling Note heights apply when patios are covered.

5.f.(1) Minimum area requirements for kitchen cabinets, counters, and pantries are shown in Table 5-5. Flat area is shown for countertops and drawers. Combined shelf area is shown for pantry and base, wall and wall cabinets.

TABLE 5-5 - KITCHEN CABINET, COUNTER, & PANTRY AREA

Type of Housing Unit	Wall		Base		Drawer		Counter		Pantry	
	m ²	ft ²	m ²	ft ²	m ²	ft ²	m ²	ft ²	m ²	ft ²
CGO/JNCO 4 BR	2.8	30	3.8	40	1.7	18	1.9	20	1.9	20
JNCO 3 BR	2.3	24	3.0	32	1.3	14	1.5	16	-	-

5.f.(2) Minimum closet width requirements are stated in Table 5-6.

TABLE 5-6 MINIMUM CLOSET WIDTHS¹

Type of Unit	Clear Width	
	mm	ft
Master ² BR #1	1800	6
BR #2	1800	6
BR #3	1200	4
BR #4	1200	4
Broom	900	2
Linen ³	600	2

Note¹: Minimum clear depth for standard/broom closets shall be 600 mm (2 ft).

Note²: Walk-in closet is preferred.

Note³: Minimum clear inside depth for linen closets shall be 430 mm (1ft.-6 in).

5.f.(3) Minimum requirements for interior, exterior, and total bulk storage are shown in Table 5-7.

**TABLE 5-7 - MINIMUM INTERIOR, EXTERIOR,
& COMBINED BULK STORAGE¹**

Type of Unit	Type of Storage	Area	
		m ²	ft ²
3 BR	Int.	3.0	32
	Ext.	3.7	40
	Comb.	7.9	85
4 BR	Int.	3.7	40
	Ext.	4.5	48
	Comb.	9.3	100

Example¹: If interior bulk storage is 3.0 m² (32 ft²), then exterior bulk storage must be 4.9 m² (53 ft²) to obtain the combined bulk storage requirement of 7.9 m² (85 ft²).

5.g. Major Zones. Living/Dining, Kitchen, Family Room, and Bedrooms.

5.g.(1) Living/Dining. The living room should have direct access to the front entrance foyer and to the dining area without passing through another room. Minimum living room area shall be 14 m² (150 square feet), minimum dimension of 3658 mm (12 feet). When circulation is required along the perimeter of the space or between areas in open plans, minimum circulation space of 1000 mm (3 ft-3 in) shall be added to the required minimum room dimension.

5.g.(1).(a) The dining area may be an extension of, or an "L" off the living room. Minimum dimension of 9 feet for two-bedroom units and at least 6 inches shall be added for each additional bedroom. Minimum dining area shall be 9.3 m² (100 square feet).

5.g.(1).(b) The dining area shall be directly accessible from the kitchen without passing through a corridor or another room.

5.g.(2) Kitchen/Auxiliary dining area.

5.g.(2).(a) The kitchen shall provide an efficient work triangle. Kitchen shall have a minimum clear walk space of 1219 mm (4 feet) between the fronts of base cabinets. A base cabinet, minimum 380 mm (15-inches) wide, shall be provided on the handle side of the refrigerator. The range shall not be located adjacent to the refrigerator, in a corner, or adjacent to a passageway. The dishwasher shall be installed adjacent to the kitchen sink. Provide a stainless steel backsplash behind the range, extending to the underside of the range hood. Countertop space of a minimum of 381 mm (15 inches.) shall be provided adjacent to the handle side of refrigerator, adjacent to both sides of range and sink. Space for a tenant-owned upright freezer shall be provided adjacent to the kitchen or in areas such as the utility room or garage. Space for a tenant-owned micro-wave oven shall be provided in the kitchen. A range hood shall be in accordance with paragraph UNIT DESIGN - HVAC .

5.g.(2).(b) In all units, auxiliary dining areas in kitchens shall be provided in the form of table space or "eat at" counter area in the kitchen area with minimum of 406 mm (16 inches) width or preferably in a family room as an extension of, the kitchen. The size of the family room should be in balance with the number of bedrooms in a housing unit. The auxiliary kitchen dining space should be provided to accommodate, as a minimum, four (4) persons in a three-bedroom unit and five (5) persons in a four-bedroom unit. Auxiliary dining shall not be located in the living room or dining room.

5.g.(3) Family room. Provide a separate family room, adjacent to and contiguous with the kitchen, for all three-, four-bedroom and five-bedroom units.

5.g.(4) Bedrooms. Bedrooms shall be designed to accommodate king-size beds in master bedrooms and twin beds in the other bedrooms. Window, door, and closet placement should enhance furnishability. Each bedroom shall be accessible without passing through another bedroom. Bedrooms that have common walls shall be acoustically designed for privacy.

5.h. Minor Zones. Bathrooms, Laundry, Closets, Stair, and Bulk Storage.

5.h.(1) Bathrooms. Emphasis shall be placed on size, furnishings, layout, and privacy. Direct access to a full bath from the master bedroom is required for all units. Compartmented bath design, for family and guest use, is not encouraged. The number of bathrooms on each floor will be determined by Table 5-8, but in no case will the total number of bathrooms for each dwelling unit be less than 2-1/2 baths. When an additional one-half bath is provided to meet the minimum 2-1/2 bath requirement, the one-half bath shall be located on the main floor (kitchen and living area level), location shall consider accessibility to both guests and family activities (kitchen, family room, outside activities, etc.) Half bath shall be open to circulation space rather than to a habitable room.

TABLE 5-8 - BATHROOM REQUIREMENTS

Number of Bedrooms per Floor	Number of Bathrooms per Floor
None	1/2
1	1 1/2
2	1 2/2
3 - 5	2 3/2

1/ If the bedroom is a master bedroom on the first floor, then the requirement is 1-1/2 baths.

2/ If one of the bedrooms is a master bedroom, then the requirement is 2 baths.

3/ If there are 3 bedrooms per floor and none of the bedrooms is a master bedroom, then the requirement is 1 bath.

5.h.(1).(a) A full bath shall contain a water closet, a lavatory with vanity cabinet and either a tub with shower assembly or a shower stall. One full bath in each unit shall include a tub with shower assembly and shall be directly accessible from the bedroom hall without passing through another room. A half bath contains a water closet and a lavatory with vanity cabinet.

5.h.(1).(b) Vanity cabinets shall be provided in all baths. Vanity countertops shall be solid surface polymer similar or equal to Corian or plywood-core with high pressure laminated plastic finish. Solid surface polymer similar or equal to Corian countertops with integral lavatories are preferred. Plywood shall be exterior grade with exterior glue. Backsplashes and endsplashes constructed of the same materials shall be provided. Countertop shall be 914mm (36 inches) minimum length and 560mm (22 inches) minimum depth. Vanity cabinets shall be plywood-core similar to the construction of the kitchen cabinets and shall not be preservative treated. Vanity cabinet shall have a minimum of one (1) door and one (1) stack of two (2) drawers. Vanity at handicapped units shall be designed to be accessible, including fixture and wheel chair space below.

5.h.(1).(c) Bathroom accessories may be surface mounted or recessed and made of non-corrosive metal or ceramic. Provide drawings indicating the location and mounting heights of all bathroom accessories. The following accessories will be provided:

<u>Bathroom Accessory</u>	<u>Full Bath</u>	<u>Half Bath</u>
Toilet paper holder (No plastic roller) <u>4/</u>	1	1
Medicine Cabinet w/Mirror Door <u>1/</u>	1	1
Soap dish in tub and/or shower area, recessed or surface mounted <u>2/</u>	1	0
Shower curtain rod	1	0
457 mm (18-inch) towel bars <u>3/</u>	1	2
610 mm (24-inch) towel bars <u>3/</u>	3	3
Bathrobe hook	3	1

1/ Minimum mirror size for full baths shall be 660 mm (26 inches) height by 914 mm (36 inches) width. Minimum mirror size for half baths shall be 660 mm (26 inches) height by 406 mm (16 inches) width.

2/ Soap dish shall be furnished without washcloth holder (i.e. grab bar).

3/ Towel bars shall not be over water closet. Towel bars shall be installed with a solid wood backing.

4/ Toilet paper holder shall be installed with a solid wood backing.

5.h.(1).(d) Tubs and showers shall not be placed under windows. Enameled cast iron tub (No lead allowed) is highly preferred over enameled formed steel tub. Shower stall floor receptors shall be non-slip solid surface polymer similar or equal to Corian®, ceramic tile or precast terrazzo. Shower pans shall be provided for shower stall floor receptors. Shower pans shall be copper. Tub and shower surrounds shall

be solid surface polymer similar or equal to Corian® or ceramic tile 2134 mm (7 ft.) high minimum from finish floor or to ceiling. Solid surface polymer similar or equal to Corian® is preferred. Fiberglass is not allowed. Tub and shower surrounds shall extend a minimum of 102 mm (4 inches.) beyond the outer edges of tub.

5.h.(1).(e) All baths shall be provided with natural ventilation by means of operable exterior openings with an area specified by codes or with mechanical exhaust ventilation shall be switch operated and shall be ducted to the exterior of the building, but not to entry area.

5.h.(1).(f) For accessible units, provide one accessible bathroom in accordance with UFAS. This bathroom shall not be the bathroom for the master bedroom. Each accessible bathroom shall have a water closet, a lavatory, and a shower stall with a 13 mm (1/2 inch) maximum curb beveled at 1:2. The accessible bathrooms shall have:

1. an accessible route to and into the bathroom with a nominal 32-inch clear door opening.
2. switches, outlets, and controls in accessible locations.
3. reinforced walls to allow for the later installation of grab bars around the toilet and shower stall, and a folding L-shaped seat in the shower stall. The location of blocking must be permanently identified on the approved design/construction drawings.
4. maneuvering space within the bathroom to permit a person using a mobility aid (wheelchair, walker, etc.) to enter the room, close and reopen the door, and exit.
5. maneuvering space and clear floor space within the bathroom to permit a person using a mobility aid to approach and use the fixtures.

Examples of bathroom floor plans with shower stalls that comply with UFAS can be found in the Fair Housing Act Design Manual, August 1996 (revised April 1998), Chapter Seven: Requirement 7 - Usable Kitchens and Bathrooms.

5.h.(2) Utility/Laundry. The location for washer/dryer space shall be in a separate utility room. Washer/dryer space shall not be provided as an enclosed recess off the hall area. Wall cabinets with two adjustable shelves of 254 mm (10-inches) nominal depth minimum are required above the washer and dryer. Wall cabinets shall not be preservative treated. The location of the dryer must insure that the length of run of the vent from the dryer to the outside vent cap shall not exceed 6096 mm (20 feet), contain no more than three 90 degree turns. (Dryer vents shall not penetrate a floor or ceiling and shall exhaust directly out to exterior wall.) Minimum net clear width of door to washer/dryer space when open is 813 mm (2 feet 8 inches).

5.h.(2).(a) Space for tenant-owned upright freezer (914 mm (3 ft) wide by 762 mm (2 ft. 6 inches) deep by 1981 mm (6 ft. 6 inches) high) shall be provided in the utility room. 305 mm (12 inches deep) removable shelving (5 shelves minimum) shall be provided in the space to allow for storage of can good items when tenant has no freezer. An electrical outlet shall be provided for the freezer as specified in UNIT DESIGN - ELECTRICAL.

5.h.(3) Closets. Closets shall provide the minimum widths indicated in Table 5-6. A broom closet shall be provided convenient to the kitchen, and a coat closet shall be located convenient to the unit entrance.

5.h.(3).(a) Closet shelving. Closets (except linen closets) shall be equipped with a 305 mm (12 inches) deep shelf and a clothes hanger rod. Linen closets shall be provided with at least four full-depth shelves. Closet shelving in excess of 1200 mm (4 ft) shall have center supports or intermediate supports not greater than 914 mm (3 feet).

5.h.(3).(b) Closet doors. Closet doors should be located to permit placement of furniture in the corners of the rooms by providing an 460-mm (18-inches) return adjacent to a furnishable wall. Closets 1800 mm (6 ft) or more in width shall have sliding doors, maximum 2000 mm (6 ft 8 inches) high. Wall closet width shall not extend beyond either door jamb more than 510 mm (20 inches). Wardrobe closet doors shall be provided with both top and bottom door tracks. Closet doors shall be wood and shall be swing, or sliding type. Sliding closet doors are required in bedrooms only. Rubber bumper stops shall be provided where closet door meets wall. Trims shall be provided to hide gaps between door and wall. Linen closets shall be provided with at least four (4) shelves. (Each closet (except linen) shall have a

wardrobe and an upper storage section with separate doors. At the Contractor's option, one (1) floor to ceiling door may be provided in lieu of the two (2) separate doors; however, the upper storage area shall not be reduced and upper storage shelf shall be adequately supported for the storage load. The wardrobe shall be provided with a clothes hanger rod without a shelf. Clothes hanger rod shall be supported at ends and supported intermediately at maximum 914 mm (3 feet) on center. The Contractor has the option to provide one (1) floor to ceiling door in lieu of two (2) doors. Shelving shall be plywood with exposed edge to be trimmed with matching strip. No particle board shall be used in closets.

5.h.(4) Bulk storage. Provide each dwelling unit with interior and exterior bulk storage space meeting the minimum requirements of Table 5-7. Provide interior storage in a separate room. Provide exterior storage in a garage separate exterior enclosure, or within the living unit with access from the exterior. A separate storage is encouraged for equipment in the back of the units. All exterior storage spaces shall be lockable. Shelving lengths in excess of 1200 mm (4 ft) shall have center supports or intermediate supports not greater than 914 mm (3 feet). See paragraph 5. j. (2) for garage storage.

5.h.(4).(a) Bulk storage space except for Garage storage should be at least 1200 mm (4 ft) in depth and a minimum clear height of 2000 mm (6 ft 6 inches), except that space under stairs may be counted at 1/2 area if the space is 1200 mm (4 ft) or more in height.

5.h.(4).(b) Provide a minimum of three nominally 305 mm (12 inches) deep shelves with a combined length of 7300 mm (24 ft) within each bulk storage room. Shelves shall be constructed with 19 mm (3/4 inch) material and supported with intermediate support when the length or span exceeds 1220 mm (4 feet).

5.h.(4).(c) Common wall and ceiling between adjacent storage areas shall be finished on at least one side.

5.h.(5) Interior Stair. All interior stairs and landing shall be hardwood and natural finish. Stair risers shall be 19 mm (3/4 inches) thick (net), 25 mm (1 inch) thick (net) treads, and 25 mm (1 inch) thick landing. Stair shall be designed to accommodate moving a king-sized bed to and from the second floor. Stair, handrail, guardrail and balcony railing requirements shall conform to the Uniform Building Code (UBC). Handrail and guardrails shall be designed such that a sphere 4 inches in diameter cannot pass through any of its openings.

5.i. Interior Finishes.

5.i.(1) Walls and ceilings. Provide 13 mm (1/2-inches) gypsum wallboard, taped and slightly textured finished. Water-resistant wallboard shall be used in wet areas such as bath, powder, laundry rooms, and cementitious backer board shall be used for ceramic tile applications. Textured ceiling finish may be provided in areas other than kitchen, laundry, or bath rooms. Interior finish on walls and ceilings shall be in accordance with NFPA 101. Provide attic access in the main unit.

5.i.(2) Kitchen/Eating area walls and ceiling. Combined kitchen/eating rooms shall have the same type of wall and ceiling finishes.

5.i.(3) Flooring and stairs, and base. Kitchen, laundry, and utility flooring shall be sheet, seamless vinyl with wood or vinyl base. Bedroom, hall, and living-dining area flooring shall be 2 mm (3/32-inches) vinyl composition tile with wood base or resilient base at first and second floor. Bathroom shall be of ceramic tile flooring with ceramic tile base, terrazzo, or seamless sheet vinyl with premolded vinyl base or terrazzo base to match. Interior stairs shall be hardwood with clear finish. There is no carpet in this project.

5.i.(3).(a) Sheet vinyl shall conform to ASTM F 1303, Type II, Grade 1. Sheet and tile vinyl flooring shall be installed as a monolithic material with seams welded or bonded for a seamless installation.

5.i.(3).(b) Ceramic tile shall conform to ANSI 137.1, moderate or heavy grade.

5.i.(4) Paint Finishes and Coating:

5.i.(4).(a) Interior surfaces, except factory prefinished material, shall be painted a minimum of one prime coat and one finish coat. Kitchens, baths, laundry rooms, and all their painted trim shall be finish painted with semi-gloss latex. Natural finished interior doors are acceptable. All other areas shall be water-based latex low sheen washable eggshell finish for walls/trim and water-based latex low sheen washable eggshell finish for ceilings. Oil-based paint is not allowed except for surfaces that require special coating. Interior paint finish may be textured. When semi-gloss and low sheen painted surfaces are adjacent to each other, the wall surfaces in the room shall be finished with semi-gloss paint to avoid having two different finishes adjacent to each other.

5.i.(4).(b) All exterior surfaces, except brick, and factory finished siding, including all utility appendages, shall receive a minimum of one prime coat and two finish coats of paint. Exterior paint shall be water-based latex. Exterior low sheen stains (two coats) will be acceptable, where appropriate for wood. Stucco shall be provided with integral color and shall be sealed with a sealer as recommended by the manufacturer. Oil-based paint is not allowed except for surfaces that require special coating.

5.i.(4).(b).1/ If CMU is used, a base coat solvent-thinned block filler, Fed. Spec. TT-F-1098 shall be used for the interior and a base coat of cement-emulsion filler shall be used for the exterior. The option to use Fed. Spec. TT-F-1098 for the exterior may be exercised if contractor can demonstrate that multiple coats applied will provide a pinhole free finish.

5.i.(4).(b).2/ Finish coats for all CMU and concrete surfaces shall be Fed. Spec. TT-P-19.

5.i.(4).(c) Exterior Finish coatings will be the manufacturer's standard base coat/finish with acrylic coating systems.

5.i.(4).(d) Application of Paint: Paint shall be applied by brush or roller. Spray painting method shall be used only under approved conditions. Spraying shall be done only when there is no wind, or under very low wind velocity. When wind velocity increases, all spraying operation shall be stopped as directed by the Contracting Officer. Before start of spraying, all surfaces that do not require painting shall be completely masked and protected. Adequate drop cloths shall be provided over floors, adjacent sidewalks, and over all cars parked nearby that may be stained or damaged from the spray work. The Contractor shall be liable for all damage resulting from the spray painting operation. All such damages shall be satisfactorily repaired and resolved at no additional cost to the Government. Adequate ventilation shall be provided during paint application. Respirators shall be worn by all persons engaged in spray painting. Adjacent areas shall be protected by approved precautionary measures.

5.i.(5) Painting Schedule: Primers, paints, and stains shall meet or exceed the latest Federal publications listed, and shall be lead free conforming to The Consumer Product Safety Act (CPSA). Interior surfaces, except factory prefinished material, shall be painted a minimum of one prime coat and one finish coat. All walls and ceilings in kitchen, baths, laundry, utility rooms, and all painted trim shall be painted with semi-gloss latex. Colors shall be submitted by the Contractor and approved by the Contracting Officer. Blown-on acoustic finish is prohibited.

5.i.(5).(a) Paints shall meet the following publications. All paints and stain, including color pigments, shall be "lead-free", conforming to The Consumer Product Safety Act (CPSA). The following publications are for reference only.

Federal Specifications (FS):

TT-C-542	Coating, Polyurethane, Oil-Free, Moisture Curing
TT-C-555	Coating, Textured (For Interior and Exterior Masonry Surfaces)
TT-E-489	Enamel, Alkyd, Gloss (For Exterior and Interior Surfaces)
TT-E-2784	Enamel (Acrylic-Emulsion, Exterior Gloss and Semigloss)
TT-P-19	Paint, Latex (Acrylic Emulsion), Exterior, Wood and Masonry
TT-P-28	Paint, Aluminum, Heat Resisting (1200 Degrees F.)
TT-P-38	Paint, Aluminum, Ready-Mixed
TT-P-645	Primer, Paint, Zinc-Molybdate, Alkyd Type
TT-S-176	Sealer, Surface, Varnish Type, Floor, Wood and Cork
TT-S-223	Sealer, Surface, Floor, Water Emulsion Type
TT-S-708	Stain, Oil; Semi-Transparent, Wood, Exterior
TT-S-001992	Stain, Latex, Exterior For Wood Surface
TT-V119	Varnish, Spar, Phenolic-Resin
TT-V-121	Varnish, Spar, Water-Resisting

Commercial Item Description (CID):

A-A-1500	Sealer Surfaces (Latex Block Filler)
A-A-1546	Rubbing Varnish
A-A-1632	(Basic) Varnish, Asphalt
A-A-1788	(Basic) Varnish, Oil: Interior
A-A-2246	Paint, Latex (Gloss, Interior)
A-A-2247	Paint, Latex (Semigloss, Interior)
A-A-2248	Paint, Latex, (Flat, Interior)
A-A-2235	(Basic) Sealer, surface (Varnish Type, Wood and Cork Floors)
A-A-2336	Primer Coating (Oil-Alkyd, Exterior Wood, White and Tints)
A-A-2339	(Basic) Stain (Wood, Solvent-Dye Type)
A-A-2340	Primer Coating (Latex, White, for Gypsum Wallboard)
A-A-2542	(Basic) Sealer, Terrazzo and concrete Floors, Water based
A-A-2834	Urethane, Waterborne (Low VOC, Clear)
A-A-2867	(Basic) Coating, Polyurethane, Single component Moisture Cure, Aliphatic
A-A-2962	(Basic) Enamel, Alkyd
A-A-2994	(Basic) Primer Coating, Interior, for Walls and Woods

Steel Structures Painting Council (SSPC) Specifications:

SSPC -Paint 5	(1991) Zinc Dust, Zinc Oxide & Phenolic Varnish Paint
SSPC-Paint 18	Chlorinated Rubber Intermediate Coat Paint
SSPC-Paint 20	(1991) Zinc-Rich Primers (Type I - Inorganic and Type II - Organic)
SSPC-Paint 25	(1991) Red Iron Oxide, Zinc Oxide, Raw Linseed Oil and Alkyd Primer (Without Lead and Chromate Pigments)
SSPC-Paint 26	(1991) Slow Drying Linseed Oil Black Maintenance Primer (Without Lead and Chromate Pigments)
SSPC SP 1	(1982) Solvent Cleaning
SSPC SP 2	(1995) Hand Tool Cleaning
SSPC SP 3	(1995) Power Tool Cleaning
SSPC SP 6	(1994) Commercial Blast Cleaning
SSPC SP 7	(1994) Brush-Off Blast Cleaning

5.i.(5).(b) Cement-Emulsion Fill Coat: Fill coat shall be an acrylic-based fill coat and shall consist of the following:

White Portland cement:	7.5 kg (16.5 pounds).
Aggregate:	15.2 kg (33.5 pounds).
Mixing liquid:	2.8 L (0.75 gallon).
Potable water:	3.8 L (1.0 gallon) maximum.
Exterior emulsion paint:	3.8 L (1.0 gallon).

5.i.(5).(b).1/ The white Portland cement shall conform to ASTM C 150, Type I. The aggregate shall be washed silica sand of the following gradation:

<u>U.S. Sieve Size</u>	<u>Percent Sand (by Weight) Passing Individual Sieve</u>
20	100
30	95 - 100
50	30 - 65
100	0 - 10
200	0 - 1

5.i.(5).(b).2/ The mixing liquid shall be a factory-prepared acrylic containing 46 to 47 percent solids. The exterior emulsion paint shall be exterior acrylic emulsion paint conforming to Fed. Spec. TT-E-2784, Type III.

5.i.(5).(c) Paints used on surfaces in areas of high humidity where mildew is possible and on fabric or vapor barrier over insulation shall contain a mildewcide. The mildewcide will not adversely affect the color, texture, or durability of the coating. The mildewcide shall be incorporated into the paint by the manufacturer and shall attain a surface disfigurement rating of 8 or greater when tested in accordance

with ASTM D 3273 and evaluated in accordance with ASTM D 3274. Mercurial mildewcide and insecticides shall not be used in paints.

5.i.(5).(d) Colors shall be as approved from schemes submitted with proposal. All interior paint surfaces shall be painted off-white. Each proposal shall include three basic exterior and interior color coordinated schemes and color samples. Floor tile, and miniblinds, shall be neutral colors. Final selection of exterior colors will be made by the Installation Commander, (USAG-HI). Exterior color selections shall conform to the Installation Exterior Architectural Plan (IEAP).

Exterior Colors

Roof Surfaces
Wall Surfaces
Soffit & Trim
Doors

Interior Colors

Wall & Ceiling Surfaces
Trim
Doors
Kitchen Cabinets
Floors
Ceramic Tile

5.i.(5).(e) Exterior color scheme for Schofield Barracks housing:
(Color numbers are referenced to Federal Standard 595B)

<u>Exterior Color Scheme</u>	<u>Siding</u>	<u>Doors/Trim</u>	<u>Gutters/DS</u>
Green Scheme	24533	24260	White
Grey Scheme	26595	26231	White
Brown Scheme	23617	20400	White

All exterior wood trim to include framing members around garage door openings shall be "back-primed" (surfaces that will be inaccessible to field painting after installation of the wood trim shall be primed with one coat of primer before installation).

5.j. Garages. Provide a single car garage for each dwelling unit. If trash or bulk storage areas are included in the garage, such areas are in addition to the required car storage area.

5.j.(1) Provide a single garage for each dwelling unit. Garages for single and duplex family housing units maybe attached or detached. Garages shall be individual and shall not be less than clear dimension of 3660 mm (12 feet) by 6700 mm (22 feet) with a minimum ceiling height of 2300 mm (7 feet 6 inches). The attached garage finished parking surface shall be set a minimum of 4 inches below the level of the family housing unit floor, except for disabled units. Delete 102 mm (4 inches) drop at disabled units or provide level change to conform to UFAS. All floors of exterior storage in or adjacent to the garage shall be set a minimum of 102 mm (4 inches) above the finished parking surface and design accordingly for disabled accessible units. All garage finished parking surfaces shall be sloped to drain away from the family housing units. Garages shall be furnished with doors as well as full height wall between garage units. Interior surfaces of garages shall be finished and painted exterior grade gypsum board. Finish interior and provide attic access in garage.

5.j.(1).(a) Garage doors shall have hardware that can be opened and locked from inside and outside of the garage. Garages at disabled units shall have adequate horizontal accessible route clearances as required by UFAS. Additionally, disabled units shall have an automatic garage door opening system complete with a wall mounted control switch and two portable remote control units.

5.j.(2) Garage Storage: An enclosed, lighted (separately switched), lockable storage space shall be attached to the garage and shall be accessible from within the garage, 610 mm (2-feet) minimum depth by 1829 mm (6-feet) minimum width.

5.j.(3) Garage Trash Storage: If provided in the garage, the finish floor elevation shall match the garage finish floor level.

- 5.k. Roofing and Drainage. Minimum slopes for roofs shall be as shown in Table 5-10.

TABLE 5-10 - ROOF SLOPES (Min.)

Roof Types	Rise	Run
Shingle/Tile	1	4
Metal	1	6

5.k.(1) Roof water. Gutters and downspouts shall be provided for all roof areas. Provide calculation of gutter and downspout size. Calculations should be in accordance with SMACNA-02, Architectural Sheet Metal Manual. Downspouts draining onto a lower roof shall have metal or plastic splash deflectors. Splash blocks shall be provided under downspouts if not connected to the storm drainage system. Building unit front entries shall be protected with a minimal 24 inch roof overhang without any breaks or open sections.

5.k.(2) Roof surface. Roof surface materials shall be fiberglass asphalt shingles, 300 lbs., three dimensional effect, Class A, wind/fungus/algae resistant, self sealing, 30 years warranty. Roof surfaces shall be light colored to minimize heat gain. Roof water shall be diverted away from entrances and foundations. Flashing made of nonferrous metal are highly desirable. Splash blocks shall be provided under downspouts not connected to storm drainage system. Aluminum or steel roofing may be used as an option but design must look like wood shake or shingle. Wood shake or wood shingle roofs are not acceptable.

5.k.(2).(a) The minimum roof slopes permitted in the technical standards for asphalt/fiberglass roof shingles may be reduced to 1:6 with certified test results to prove the roofing system withstands the applicable design criteria.

Roofing systems, other than shingle or built-up type, shall have the manufacturer's 15 year or more written guarantee that the roofing shall not require maintenance or repair due to leaking, cracking, chipping, blistering, erosion of the original finish or manufacturing defects. Exposed roof sheathing on eaves shall be graded for appearance.

5.k.(3) Eaves and Rakes. Roof eaves shall be 610 mm (2 feet minimum), 762 mm (2 feet - 6 inches) preferred. Rakes, when provided, shall be 301 mm (1 foot) minimum. Fascia boards shall be a minimum of 2 inches (nominal) thick, and they shall be primed before installation.

- 5.k.(4) Sheet Metal Work. Sheet metal materials, in order of preference, are as follows:

<u>Order of Preference</u>	<u>Sheet Metal Materials</u>
1	Stainless Steel
2	Copper
3	Aluminum
4	PVC (for gutters and downspouts only)

Note: Flashing - Continuous stepped flashing to be installed at wall adjacent to roof slope. Design to facilitate easy maintenance and removal of roofing without removing or damaging the wall sidings. Galvanized sheet metal shall be shop-primed and painted. Provide metal drip edge of flashing at roof eaves.

5.k.(5) Gutters/Downspouts: Continuous gutters and downspouts shall be provided on fascia board at eaves for all roofs at family housing units. If the roof rafters are square cut, wedges must be provided between the fascia and gutter to install the gutter plumb. A concrete splashblock shall be provided at the end of each downspout. Sheet metal or plastic splash pans shall be provided at the end of each downspout discharging on to a lower roof. Gutters and downspouts shall not discharge rain water over walkways leading into a housing unit or into an enclosed courtyard unless a storm drainage system is

provided to remove such discharge to an area beyond the limits of the building(s). Slope finish grade away from dwelling unit. Gutter and downspouts shall be adequately sized to meet the following Design Rainfall Intensities:

Schofield Barracks: Design Rainfall Intensity (hourly in inches for a 5-minute period to be expected once in 10 years) = 188 mm (7.4 inches).

5.k.(6) Common roofs. Parapet walls are prohibited.

5.l. Exterior Finishes. Emphasis shall be placed on low maintenance and durability for exterior finish materials. Materials shall be residential in size, scale, and texture. Exterior wall materials are as follows:

<u>Order of Preference</u>	<u>Exterior Wall Materials</u>
1	Factory prefinished vinyl siding with vinyl or prefinished aluminum accessories.
2	Concrete - painted
3	Concrete masonry units (CMU) - painted.
4	Portland cement plaster (stucco) on metal lath with integral colored finish.
5	Exterior Insulation and Finish System/Exterior Finish System.
6	Brick
7	Factory prefinished wood siding.
8	Factory prefinished aluminum siding.
9	Factory prefinished steel siding.

Note: Other exterior wall materials of equal quality and durability shall be evaluated and their position in the order of preference shall be considered where appropriate.

5.l.(1) Panel materials in large surfaces shall be avoided unless surfaces are broken with texture or battens. Battens for prefinished materials shall also be factory finished.

5.l.(2) Portland cement plaster (stucco) total surface shall be divided into panels with control joints spaced 3048 mm (10 feet) apart, preferably to form a square of less than 13.9 m² (150 square feet) enclosed within the control joint perimeter.

5.l.(3) Wood fascia and rakes shall be 25 mm (1-inch) nominal boards with solid blocking or 51 mm (2-inch) nominal boards without blocking. Plywood, hardboard, or gypsum board are not permitted as fascias and rakes.

5.l.(4) A brick cap and flashing shall be provided for all offset brick veneer.

5.l.(5) Bricks, concrete masonry units, and Portland cement plaster (stucco) finish shall be residential size, scale and texture. That which is indicated in the design proposal shall not be changed without Contracting Officer's approval.

5.l.(6) Factory prefinished siding shall be provided with a minimum, nonprorated, 15-year warranty on finish. All siding material shall be kept a minimum of 152 mm (6 inches) from finish grade. Install building paper or similar material before installing exterior siding.

5.l.(6).(a) Lap siding shall be either single pieces with a maximum 203 mm (8-inch) width or single pieces shaped to simulate maximum 203 mm (8-inch) width (that is, double-four, double-five, triple-four, etc., sidings are acceptable).

5.1.(6).(b) Aluminum siding shall conform to the requirements of AAMA 1402.3 Voluntary Specification for Aluminum Siding, except aluminum substrate shall be a minimum of 0.024-inch thick if it is not fiberboard-backed. For fiberboard-backed aluminum siding, the aluminum substrate shall be a minimum of .48 mm (0.019-inch) thick.

5.1.(6).(c) Steel siding shall conform to the following requirements: The siding material shall be a minimum of .43 mm (0.017-inch) thick (29-gage), zinc-coated steel conforming to ASTM A 526, G-90 coating. Siding panels shall be formed to provide full length edge interlock, so that after installation, fasteners will be concealed from view. Siding shall be pretreated and either factory-primed and finish-painted or factory-laminated with a weather-resistant polymer film. When tested for 500 hours in accordance with ASTM B 117, the siding finish shall show no signs of cracking, blistering, peeling or significant color change and shall show no loss of adhesion from the metal more than 1.6 mm (1/16-inch) beyond a line scratched or scribed through the coating. Siding shall be installed in strict accordance with the manufacturer's recommendations.

5.1.(6).(d) Steel siding materials shall be separated from aluminum surfaces with a coating of bituminous paint or asphalt varnish.

5.1.(6).(e) Vinyl Siding shall conform to the requirements of ASTM D 3679, Rigid Poly (Vinyl Chloride) (PVC) Siding.

5.1.(6).(f) Painting & Coating. Exterior factory prefinished siding materials shall have the manufacturer's written guarantee that the finish shall not require maintenance to repair because of cracking, chipping, crazing, blistering, flaking, peeling or erosion of the original finish. This warranty also shall cover manufacturing defects for a minimum of 15 years.

5.1.(6).(f).1/ To decrease the possibility of uneven fading due to different fading rates, only siding from a single batch or lot shall be used on any single housing unit.

5.1.(6).(f).2/ A manufacturer's representative shall instruct and provide literature for instructions of installation to the installer or the Contracting Officer or his representative, of the siding, appurtenances, and accessories as to the manufacturer's required installation procedures. The Army construction inspectors responsible for the job shall be included in this instruction.

5.1.(6).(f).3/ Siding, appurtenances, and accessories shall be installed in strict accordance with the manufacturer's printed instructions to avoid cancellation of factory warranty. Variances from these printed instructions shall have written approval from manufacturer's authorized representative.

5.1.(6).(f).4/ Upon completion of the installation, the manufacturer of the siding shall furnish to the Contractor and the Contracting Officer a certification that the siding system was installed in strict accordance with their printed instructions.

5.1.(7) Exterior finish coatings will only be installed over cement board or fiberglass reinforced exterior gypsum board (Dens-glass) materials.

5.1.(8) Termite decay and protection for exterior wood materials (siding, trims, etc.) shall be in accordance with National Wood Window and Door Association (NWWDA) Standards. Each piece of treated material shall bear identification of the testing agency to indicate performance in accordance with NWWDA.

5.1.(9) Trim elements. Aluminum or vinyl clad wood trim is preferred over painted or stained wood trim. Painted exterior surfaces shall be minimized. When exterior exposed wood trim is used the following requirements apply:

5.1.(9).(a) Exposed wood, such as window trim, door sills, window sills, railings and balusters, trellis, wood fencing, arbors, solar shading devices including louvers, arbors, and trellis shall be treated for rot resistance in accordance with NWWDA Industry Standards I.S.4, Water Repellent Preservative Treatment for Millwork.

5.I.(9).(b) Exterior surfaces requiring painting shall receive a minimum of one prime coat and two finish coats of paint. Wood trim frames, etc., shall be back primed. Exterior semi-transparent low sheen stains, two coats, are acceptable, where appropriate for wood, plywood, etc.

5.I.(10) Other surfaces. Criteria for patios, and porches, exterior stairs, and exposed wood are listed below.

5.I.(10).(a) Patios shall be sloped to drain and have a broom-finished concrete floor surface.

5.I.(10).(b) Porches located directly above other porches, or patios, shall be sloped to drain and have a concrete floor surface which provides a waterproof and non-slip surface. Plastic coating or films over concrete decks are not acceptable. Exposed wood decks, stained or painted, are not acceptable. Exposed wood rails and trim shall be treated to deter damage from (moisture decay and termite infestation.)

5.I.(10).(c) Exterior stair treads and landings shall be constructed of concrete or steel and provided with non-slip type treads. Exposed wood rails and trim shall be treated to deter damage from (moisture decay and termite infestation).

5.I.(10).(d) Cement asbestos shingle siding, ceiling or soffit will not be permitted. If exterior ceilings soffits are provided, all joints will be trimmed or otherwise architecturally treated. If exterior ceilings soffits are not provided, the exposed framing and underside of deck in these areas shall be painted or stained. If exterior ceilings and/or soffits are provided, vinyl, plywood, prefinished metal or 9.5 mm (3/8-inches) 303 medium density overlay siding material, EXT-APA or equal conforming to American Plywood Association Standard B840, 303 Siding Manufacturing Specifications, or cement plaster shall be used.

5.I.(11) Patio: A concrete paved patio shall be provided for each housing unit, with direct access from living/dining/family room area. Patio for disabled units shall be accessible to wheelchair from the interior floor. Patio shall be disabled accessible to grade level. The patio shall be fully covered and shall be an integral part of the dwelling unit design.

5.I.(12) Outside Clothes Drying Facilities: Pipe sleeves and cap shall be provided at grade for rotary (umbrella) type clothesline posts. Rotary (umbrella) type clothesline posts will be Government-furnished. Size of pipe sleeves shall be coordinated with the area housing office.

Pipe sleeves and caps shall be provided for all non-apartment family housing units and for all ground level apartments.

5.I.(13) Privacy and Screen Fencing: Self-supporting privacy fencing and gate shall be provided as an integral part of project and unit design to create an enclosed, visually private yard, containing patio and lawn space of approximately 47 m² (500 square feet) for all non-apartment units. Self-supporting screen fencing shall also be provided as an integral part of design to conceal service elements such as trash receptacles, clothes drying, etc. Trash receptacles screen fencing shall have sufficient clearances to permit easy access to the container for trash disposal including a smooth floor transition between the trash container area and the adjacent floor. Landscaping and chain link materials are not acceptable for screen fencing. Bottom of screen shall follow the contour of finish grade. Direct burial of ferrous supports for screen fencing shall not be permitted. Fencing material shall be materials other than wood such as constructed of concrete with simulated wood-grain (top 1 ft. edge shall be decorative), brick, rock patterns or Plastic/vinyl fences. Privacy and screen fencing shall be 1525 mm (5') high. Provide in-swinging gates and gate posts with non-corrosive reinforcement and hardware. Fence shall not touch/connect to dwelling unit (min. separation shall be 1 inch).

*

5.m. Windows and Doors. Windows and glazed door (50% or more glass) units shall meet the following standards and must be certified by an independent testing laboratory. Windows that slide (double-hung, single-hung, and horizontal sliding) and glass exterior doors shall meet the standards for hung units. Standards for casement windows shall apply to all hinged or fixed windows. Other window types may be used if they have been tested and conform to the standards for hung windows. Window frames

constructed of a composite material (blend of wood fiber and thermoplastic polymer) similar or equal to Fibrex® is preferred. The contractor will provide the manufacturer's certification that the window provided meets the following test requirements:

5.m.(1) Windows and Sliding Glass Doors.

5.m.(1).(a) Required Tests. Hung units will meet a National Fenestration Rating Council (NFRC) design pressure rating of 25. Casement windows will meet NFRC design pressure rating of 40. Evidence of passing the following specific tests and minimum standards are required to achieve these design pressure standards.

5.m.(1).(a).1/ Structural Testing. Using ASTM E330, test results shall demonstrate no glass breakage, damage to hardware, or permanent deformation that would cause any malfunction or impair the operation of the unit. Residual deflection of any member shall not exceed 0.4% of its span. Hung windows shall be tested at pressures of 1796 Pa (37.5 lb/ft²), and casement windows shall be tested at pressures of 2873 Pa (60.0 lb/ft²).

5.m.(1).(a).2/ Operating Force. The force necessary to unlatch and open units shall not exceed 13.6 k (30 lb) for hung units and 15.9 k (35 lb) for casements.

5.m.(1).(a).3/ Air Infiltration. Using ASTM E283, leakage rate shall not exceed .65 l/min/m² (0.25 ft³/min/ft²) for hung units and .39 l/min/m² (0.15 ft³/min/ft²) for casements, at a test pressure of 7.66 k/m² (1.57 lb/ft²).

5.m.(1).(a).4/ Water Penetration. Using ASTM E547, no leakage shall be evident when tested in three, five-minute cycles with a one-minute rest period between cycles at 18.3 k/m² (3.75 lb/ft²) for hung units and 29.3 k/m² (6.0 lb/ft²) for casements.

5.m.(1).(a).5/ U-Value. U-values shall be calculated using ASTM E1423, and NFRC 100-91.

5.m.(1).(b) All windows above the ground floor shall be designed for cleaning both sides of the glass panes from the interior. All windows shall be secured with a positive locking device from the interior.

5.m.(1).(c) Aluminum windows and trim shall have an architectural class II anodized finish (0.4 to 0.7 mil thick) in accordance with Aluminum Association Standards for Anodized Architectural Aluminum..

5.m.(2) Sliding glass doors. Sliding glass doors shall have insulated steel, vinyl clad wood, or thermal aluminum frames conforming to the above requirements. Finish shall be factory applied and conform to 44-C-22431 in accordance with the requirements of the National Association of Architectural Metal Manufacturers (NAAMM) Metal Finishes Manual. Glass shall be laminated. glass. Sliding panels shall be equipped with screens having extruded aluminum tubular frames mitered at corners, channel-shaped corner angle reinforcement and nylon bottom rollers. Doors shall have interior operated latch, and securing pin or throw-bolt in frame. Screening shall be nonferrous.

5.m.(2).(a) Secondary locking devices shall be provided for all sliding glass doors. Provisions shall be made so that the sliding door cannot be removed from the track when the door is in a locked position. Sliding door shall slide on the inside of the fixed glass panel.

5.m.(3) Where glass extends to floor or to within 457 mm (18 inches) of the floor or exterior lockset, it shall be fully tempered safety glass.

5.m.(4) 6 mm (¼ inch) thick laminated glass is preferred for all other exterior windows and sliding glass doors. The laminated glass shall consist of two layers of Type I transparent float glass (quality q3, glazing select) conforming to ASTM C 1036. Glass shall be bonded together with 0.76 mm (0.030 inch) thick polyvinyl butyral interlayer under pressure. Glazing for windows at bathrooms shall be patterned or figured.

5.m.(5) Windows, sized to accommodate air conditioner, shall be provided in the living room and master bedroom. Single hung vertical window is allowed for A.C. window only. This unit/window shall be designed so that the A.C. unit will not be located directly above the walkway or habitable areas and drip condensation on walkway or habitable areas.

5.m.(6) Interior window stools may be solid-wood, paint-grades with a minimum thickness of 19-mm (3/4-inches). Ceramic tile sills are preferred in masonry construction.

5.n. Screens. Fiberglass screens shall be provided at all operable sashes and sliding doors. Screens shall be nonferrous, of window manufacturer's standard design. Fiberglass insect screens, 18 x 16 mesh size, shall be provided for all windows and sliding glass doors and should be the window or door manufacturers standard design for use with the windows and doors being provided. Insect screen frames shall be removable type for easy cleaning.

5.o. Window Treatments. Provide 25 mm (1 in.) mini-blinds at windows and glazed hung doors. Color shall be manufacturers standard off white, and shall be coordinated with wall color.

5.o.(1) Only traverse rods shall be provided at all exterior sliding glass doors. Miniblinds shall be provided for all windows. Solid wood backing shall be provided at all openings for proper anchorage of the traverse rods, and miniblinds. No drapes in contract.

5.o.(2) Miniblinds shall be provided for all other windows not covered under paragraph 5.o.(1) above.

5.p. Exterior Doors. Exterior doors shall be solid core wood (lumber-core only) and shall have exterior glue. Exterior door frames shall be wood or hot-dip galvanized steel with G90 coating. All exterior doors opening to stoops or walks shall be flush. Stoop shall have maximum level change from interior slab IAW UFAS . Sidewalk to all dwelling unit entrances shall be ramped up to stoop.

5.p.(1) Exterior entry doors shall swing into the family housing units. Screen doors shall swing out of the family housing units.

5.p.(2) Entrance doors. The unit primary entrance door shall be 900 mm (3 ft.) in width by 2050 mm (6 ft -8 in.) in height by 45 mm (1-3/4 inches) thick, solid core wood. Other unit entrance doors should meet this requirement but may be of lesser width.

5.p.(3) Bulk storage door. Exterior bulk storage door shall be a minimum 45 mm (1-3/4 inches) thick, exterior grade, or solid core wood . Storage areas are located in garages and shall be lockable. Storage walls shall be finished with low sheen paint.

5.p.(4) Screen Doors: Wood screen doors shall be provided for all exterior hinged door openings. Frames shall be a minimum of 35 mm (1-3/8 inch) thick with additional stile in the middle for support. Screen doors shall be provided with closers and lock similar to aluminum screen doors. A screen guard shall be provided for the lower half of the door. Screen mesh shall be 18 by 16 fiberglass mesh. Screen doors will swing against walls. Wood screen doors at the disabled units shall be easily modifiable.

5.p.(5) Interior doors. Interior doors shall be 2050 mm (6 ft -8 in.) in height by 35 mm (1-3/8 inches) thick, hollow core wood. Wood doors will be painted. Interior doors shall be provided in accordance to standard construction and design practices.

5.q. Builders Hardware. Hinges, locks, and latches will comply with the specifications indicated in Table 5-11, and the following subparagraphs.

5.q.(1) Front entrance door hardware shall be interconnected lock conforming to ANSI A156.12. All other door hardware shall be bored-type conforming to ANSI A156.2, Series 4000, Grade 1 for exterior doors, Grade 2 for interior doors.

5.q.(1).(a) All swinging doors, except doors to linen closets, shall have a wall mounted door stop. Hinges acting as door stop or closer and door mounted stops are not acceptable. Provide solid wood backing in the stud wall cavity for wall mounted door stops.

5.q.(1).(b) Interior privacy latchsets shall be provided for bedrooms, baths and half baths. All interior doors shall have one pair of butts and a door stop.

5.q.(1).(c) All disabled dwelling units shall have lever type door handles.

5.q.(1).(d) Each housing area shall be provided with six (6) sets of master keys furnished to the Contracting Officer. Locks within each family housing unit, including locks for exterior storage rooms, shall be keyed alike. Except for master-key, keys for one quarter shall not be able to operate locks in another quarter. Four (4) sets of keys for each family housing unit shall be provided with lock number identification stamped on two (2) of them.

TABLE 5-11 - HARDWARE SPECIFICATIONS

Hardware Type/ Specification	Specific Requirements
Hinges ANSI A156.1	Hinges shall be 115 mm x 115 mm (4-1/2 in x 4-1/2 in) solid brass ball bearing (equal or similar to Stanley FBB179) at exterior doors other than screen doors, and with nonremovable pins or safety studs if outswinging. Hinges shall be 90 mm x 90 mm (3-1/2 in x 3-1/2 in) at interior doors.
Locks & Latches ANSI A156.2	Bored deadlock, Grade 1, at exterior doors. Grade 2 at interior doors. Provide lever handles, aluminum, or stainless steel.
Auxiliary Locks ANSI A156.5	Bored deadlock, Grade 2. Provide matching trim of wrought brass, aluminum, or stainless steel. Provide lever handles.
Interconnected Lock & Latches ANSI A156.12	Grade 2. Provide matching trim of wrought brass, aluminum, or stainless steel.
Closers ANSI A156.4	Series CO2000, Grade 2.
Auxiliary Hardware ANSI A156.16	

5.q.(2) Locks and keys. Lock cylinders shall have six pin tumblers and interchangeable cores which are removable by a control key. Provide a master keying system. Locks for each dwelling unit, including exterior storage shall be keyed alike. Contractor shall obtain the key bitting report from the hardware manufacturer and provide the report to DPW (Mr. Kimo Kenolio, 656-0644) at the end of the project. Garage closer(s) may be keyed separately from dwelling unit. Locks and keys shall conform to the standards and requirements of the Builders Hardware Manufacturers Association (BHMA) listed above.

5.q.(3) Weatherstripping/Exterior thresholds. Provide nonferrous metal or vinyl weatherstripping for all dwelling unit exterior doors. Vinyl magnetic weatherstripping is acceptable for metal door. Exterior thresholds shall be nonferrous metal.

5.q.(4) Applications. Locks and hinges shall be applied as follows:

5.q.(4).(a) Exterior hinged doors shall have 1-1/2 pair of hinges, lockset, and an auxiliary lock, or interconnected lock and latch. Hinges with loose pins on out swinging exterior doors will be specified with non-removable pins or safety stud.

5.q.(4).(b) A standard viewer (peep hole) should be at 1524 mm (5 ft) height and shall be provided at all main entrance doors. Viewer shall be ANSI A 156.16, L03171. Peep hole shall be slanted upward and installed at users level for the disabled units only. Level of peephole for the disabled shall conform to requirements of the UFAS .

5.q.(4).(c) Exterior bulk storage door shall have 1-1/2 pair of hinges and lockset.

5.q.(4).(d) Interior doors shall have one pair of hinges and latchset with ANSI A156.2, F75 or F76 operations.

5.q.(4).(e) Doors in fire-rated walls, dwelling unit to garage, shall have 1-1/2 pair of ball-bearing hinges, lockset, auxiliary lock or interconnected lock and latch and closer.

5.q.(4).(f) Garage side exterior doors shall have 1-1/2 pair of hinges and lockset.

5.r. Postal service and building signage. Each unit with exterior entrance will have a number visible from the vehicular circulation.

5.r.(1) Mailboxes: All housing units shall be provided with mailboxes. Mail receptacles shall conform to the current criteria in USPS Publications. 203 mm (8-inch) thick concrete slabs shall be provided to support Centralized Mail Delivery Units. Each Centralized Mail Delivery Unit will consist of mailboxes, parcel post lockers and a letter collection receptacle to be furnished and installed by the Contractor. Centralized Mail Delivery Units shall be located so that occupants need not cross a street to get mail. Central Mail Delivery Units shall serve a maximum cluster of twenty five (25) family housing units. Mailbox setback with size and quantity of concrete slabs shall be coordinated with the US Postal Service. Mail boxes shall be accessible to the disabled.

5.r.(2) Nameplate Holders: Extruded aluminum nameplate holders shall be provided for each dwelling unit. Size of nameplate holders shall be 29 mm (2-1/8 inches) high by 660 mm (26 inches) long and shall be slotted to receive existing plastic or metal letters inserted into the slot. See Figure 5.

5.s. Kitchen Cabinets. Design will be functional and assure safe and convenient use and circulation. Cabinets shall have magnetic catches except where spring-loaded self-closing hinges are provided. Cabinets shall conform to ANSI A161.1, Recommended Performance and Construction Standards for Kitchen and Vanity Cabinets, except where modified below. Wall and base cabinets shall be essentially of the same construction and appearance. Refer to Table 5-5 for minimum kitchen cabinet area requirements.

5.s.(1) Kitchen cabinets shall be factory manufactured, and have adjustable shelves in wall cabinets. Countertops shall be solid surface polymer equal or similar to Corian®, plywood-core cove type, or plywood-core fully formed type with high pressure laminated plastic 1.1 mm (.043-inch) thick top and backslashes with heat resistive adhesive. Countertops shall be fully formed at front and backslash is preferable. Plywood shall be exterior grade with exterior glue. End splashes constructed of 19 mm (3/4-inch) plywood core shall be supplied. Solid surface polymer (Corian®) countertops are preferred. Cabinets shall conform to the requirement of the National Kitchen Cabinet Association except where modified below. Broom storage shall be a minimum 610 mm (2 feet) width and shall be provided within or proximate to the kitchen or utility room. Wall and base cabinets shall be medium density fiberboard (MDF). Exposed surfaces of laminated plastic cabinets shall be faced with decorative high pressure laminated plastic sheets a minimum of .71 mm (.028-inch) in thickness. Interior face of hinged doors shall be covered with minimum of .51 mm (.020-inch) thick laminated plastic liner and self edge bands shall be a minimum of .72 mm (.028-inch) thick. Plastic laminate shall conform to the requirements of NEMA LD3 and plastic laminate adhesive shall be contact type applied to both sides. Design of

countertop space shall take into consideration a tenant-owned full size microwave oven with spatial dimension of approximately 610 mm (2 feet) wide by 508 mm (20 inches) deep by 406 mm (16 inches) high. An outlet shall be provided adjacent to space designed to accommodate tenant-owned microwave oven. Kitchen cabinets shall not be preservative treated. No "dead or blind corners" base cabinets will be allowed in corners.

5.s.(2) Disabled unit counters, cabinets and other accessories shall be designed to be adaptable/modifiable and/or fully disabled accessible per par. 5.a.(2)(a) and clearly noted or indicated on the drawings. The maximum accessible counter height is 865 mm (34 inches). In disabled identified units, the square footage of base and any other cabinets shall be increased proportionally to compensate for potential loss of cabinet space when conversion or modifications for disabled personnel would occur.

5.s.(3) Cabinets construction. Construct cabinets with frame fronts and solid ends, or of frame construction throughout. Cabinet frame fronts, doors and drawers shall be constructed of solid hardwood with raised panel door construction. All other structural components of the cabinets shall be constructed of ANSI A208.2-1994 MDF. Frame members shall be mortised and tenoned, dove-tailed or doweled, and glued together. Brace the top and bottom corners with hardwood blocks that are glued with water-resistant glue and nailed in place. Wall and base cabinets shall be essentially of the same construction and outside appearance. Cabinets shall be constructed with frame fronts and solid ends, or of frame construction throughout. 19 mm (3/4-inch) by 38 mm (1-1/2 inch) kiln dried hardwood frame members, mortised and tenoned, dove-tailed or doweled, and glued together shall be provided. Top and bottom corners shall be braced with hardwood blocks that are glued with water-resistant glue and nailed in place. An integral toe space of at least 64 mm (2-1/2 inches) deep by 102 mm (4 inches) high on base cabinets shall be provided. Toe kick shall be plywood. Drawers shall be mounted on 20 gage metal side guides. Doors and drawers shall be beveled edges for operation without pulls or knobs. Minimum (nominal) thickness of materials for cabinet construction shall be as follows:

5.s.(3).(a) Cabinet backs: 4.8 mm (3/16-inch) MDF or 3.2 mm (1/8-inch) tempered hardboard. Sink cabinets shall have full backs. The full back requirement for sink backs may be omitted for handicapped units.

5.s.(3).(b) Bottoms of base cabinets and tops of wall cabinets: 13 mm (1/2-inch MDF; 13 mm (1/2-inch) MDF. Bottoms shall be supported on ends and on 610 mm (24-inch) centers.

5.s.(3).(c) Cabinet ends: MDF 16 mm (5/8-inch) shall be used for base cabinets and 10 mm (3/8-inch) shall be used for wall cabinets.

5.s.(3).(d) Door 19 mm (3/4-inch) solid stock hardwood, clear grade for natural finish.

5.s.(3).(e) Drawer fronts: 19 mm s(3/4-inch) solid stock hardwood, matching doors.

5.s.(3).(f) Drawer bottoms: 13 mm (1/2-inch) MDF. On drawers over 381 mm (15 inches) wide, bottoms shall be braced with wood members glued in place.

5.s.(3).(g) Drawer sides and backs: 13 mm (1/2-inch) MDF.

5.s.(3).(h) Interior partitions or dividers: 16 mm (1/2-inch) MDF.

5.s.(3).(i) Shelves: 13 mm (5/8-inch) MDF. Shelves shall be supported on ends and on 610 mm (24-inch) centers. All shelves shall be full depth of cabinets.

5.s.(3).(j) Lazy-susan units will be provided on both shelves in corner base cabinet units to assure accessibility.

5.s.(3).(k) "Excellent" quality points will be awarded for extra accessories and convenience features.

5.s.(4) Solid Polymer Countertops. Material shall be 19 mm (3/4 inch) thickness, cast, and filled nonporous solid surfacing composed of acrylic polymer, mineral fillers, and pigments. Superficial damage to a depth of 0.25 mm shall be repairable by sanding or polishing. Material shall comply with the following requirements.

5.s.(4). (a) Tensile Strength; 18.3 N/mm² (4100 psi) when tested in accordance with ASTM D 2583.

5.s.(4). (b) Hardness; Barcol Impressor 50 when tested in accordance with ASTM D 2583.

5.s.(4). (c) Flammability; rated Class I with a flame spread of 25 maximum and a smoke developed of 100 maximum when tested in accordance with ASTM E 84.

5.s.(4). (d) Boiling water resistance; no effect when tested in accordance with NEMA LD 3.

5.s.(4). (e) High temperature; no effect when tested in accordance with NEMA LD 3.

5.s.(4). (f) Liquid absorption; 0.06% maximum (24 hours) when tested in accordance with ASTM D 570.

5.s.(4). (g) Sanitation; National Sanitation Foundation approval for food contact in accordance with Standard 51 and approval for food area applications.

5.s.(4). (h) Impact resistance; no failure for ball drop when tested in accordance with NEMA LD 3.

5.t. Door Chimes. All housing units shall be provided with a door chime in accordance with subparagraph DOOR CHIMES of paragraph UNIT DESIGN-ELECTRICAL. Door chimes for the disabled units shall be readily modifiable for the hearing impaired. ADAAG section 9.3.1 discusses visual notification devices that alert occupants of a door knock or bell. Notification devices shall not be connected to auxiliary visual alarm signal appliances.

5.u. House Numbers. All housing units shall be provided with house numbers. House numbers shall be on "Address-O-Lite" fixtures or equal. Building/address and family housing unit numbers shall be provided as follows:

Four-digit (numeral) building/address number = Minimum two (2) per building.

Five-digit (combination numeral/alphabet) unit number = one (1) per family housing unit at the garage.

Building and Unit Numbers shall be coordinated with the respective housing office. At least one of the building/address number signs shall be installed facing the street.

Building and cul-de-sac signs shall be provided (see subsection BUILDING SIGNS of Attachment PROJECT AND HOUSING SIGNS, for cul-de-sac sign details).

5.v. Exterior Railings. Exterior railing materials, including bolts and fasteners, in order of preference, are as follows:

<u>Order of Preference</u>	<u>Railing Materials</u>
1	Stainless Steel, Type 316
2	Aluminum, Anodized (AA - Architectural Class II; 0.4 to 0.7 mil coating)
3	Galvanized Steel (painted)
4	Wood

Handrail and guardrails shall be designed such that a sphere 102 mm (4 inches) in diameter cannot pass through any of its openings.

5.w. Housing Area Signs: No housing area signs are required.

5.x. Appliances. Provide the following equipment in accordance with specifications listed, one each per dwelling unit.

5.x.(1) Refrigerators. Comply with UL 250, Household Refrigerators and Freezers and shall bear the EPA "Energy Star" certified label; refrigerator with frostproof top freezer, automatic defrosting and automatic ice maker; refrigerator shall have two vegetable bottom baskets, at least four adjustable shelves, at least two shelves and egg container in the door; freezer compartment shall contain separate interior shelves, multiple door shelves and automatic ice maker.. Provide reversible (left swing and right swing interchangeable) doors. Refrigerator/freezers in units designated as accessible for the handicapped shall conform to UFAS requirements. Refrigerators shall conform to the energy compliance standard of 10 CFR 430, including those refrigerators manufactured before the code took effect. Offers incorporating refrigerators using refrigerants with lower Ozone Depletion Potential (ODP) values will be considered more advantageous to the Government than offers in which higher ODP values are proposed. Minimum refrigerator volume and maximum energy use requirements are:

Volume:	0.58 m ³ (21 ft ³)
Energy Efficiency:	722 kWh/year

5.x.(2) Ranges/Ovens. Electric ranges shall be 760 mm (30 inches) wide and provided with porcelain enamel cooktop, oven, clock/timer, oven light, and cooking surface light. Oven shall have black glass window door, broiler pan, and self-lock racks. Stand-up ranges shall be installed with anti-tip brackets anchored to the floor. Separate cooktop with front mounted controls and self-cleaning wall oven shall be provided for the disabled identified units.

Electric ranges shall have four [6" (2 ea.) & 8" (2 ea.)] tubular plug-in surface elements of 4,500 watts minimum, removable reflector bowls, infinite-control switches, and range-indicating lights. Ovens shall be equipped with one 2,000-watt (minimum) tubular broil element and one 700-watt (minimum) bake element, oven indicating light, thermostatic heat control, utensil drawer, and self-cleaning oven. Electric ranges shall conform to UL 858, Household Electric Ranges. Electrical installation shall comply with the latest edition of the National Electric code for grounding.

5.x.(3) Range hoods. Provide metal range hoods, the same length and finish as the range, with separately switched light and exhaust fan. The hood shall have a washable filter. The fan shall have a capacity of not less than 78.7 L/s per meter of range hood (50 cubic feet per minute per linear foot of range hood). The sound level shall not exceed 6 sones. Duct the fan to the exterior and provide backdraft protection.

5.x.(4) Garbage disposals. Garbage disposals shall conform to ASSE 1008 and UL 430; Waste Disposers; continuous feed, minimum 1/2 HP motor, stainless steel grinding elements and chamber, two 360-degree stainless steel swivel impellers, manual motor reset, and sound insulation. (A plug connector is required.)

5.x.(5) Dishwashers. Dishwashers shall conform to UL 749, Household Electric Dishwashers, and be UL listed, electric type, with air gap, racks, lift-out utensil holder, spraying arms, and detergent dispenser. Unit shall be listed as "Energy Star" compliant and shall bear the "Energy Star" label. The automatic controls shall cycle through the Wash, Rinse, Dry/Heat, and Stop phases, and shall be capable of rinse and hold cycle as well as a no heat drying feature. The unit shall contain instantaneous, or in-line, water heater booster, with automatic thermostat set for 60 degrees C (140 degrees F). Rated energy use for standard capacity models will not exceed 620 kWh/yr.

5.x.(6) Water heater. See paragraph 8.g.

5.x.(7) Color. Kitchen appliances, except disposals, shall be of matching finish, white or off-white in color.

5.x.(8) Maintainability. The design of housing units including the selection and specifying of exterior and interior finishes, equipment, appliances, and systems shall include consideration of maintenance ease and cost. Avoid products that require continuing maintenance at high cost.

5.x.(9) Clothes Washer: UL 2157

5.x.(10) Clothes Dryer: UL 2158

5.x.(11) Smoke Detector: Smoke Detector shall be in accordance with Section 9, Electrical, paragraph 9.I.

5.y. Fixture support. Provide solid wood backing in the stud wall cavity for stair handrails, toilet paper holders, towel bars and other wall mounted items where noted in this document. Balcony railings, guard rails, and handrail shall be designed to resist the loads specified in the Uniform Building Code (UBC).

6. UNIT DESIGN - STRUCTURAL.

Structural design and construction for the family housing units (FHU) shall comply with the HUBC. The primary framing of the FHU's shall be light gage (cold formed) steel framed construction. Design Loads shall meet the minimum load standards shown in Table 6-1.

TABLE 6-1 - MINIMUM LOAD STANDARDS

Load Type	Requirement
Dead Load	Actual
Floor Live Load	195 k/m ² (40 psf)
Balcony Live Load	293 k/m ² (60 psf)
Common Stairs/Exits	488 kg/m ² (100 psf)
Roof Live Load	98 kg/m ² (20 psf)
Wind Load	Basic Wind Speed IAW HUBC Exposure "C"
Seismic Load	Zone 2A

6.a. Foundation. Foundation shall be concrete footings and/or thickened slab edges compatible with the soil and climatic conditions of the site.

6.b. Slab -On Grade. Non-structural slab-on-grade for houses, patios, and garages shall have 152 mm by 152 mm - MW19 X MW19 (6 by 6 - W2.9 by W2.9) galvanized welded wire fabric reinforcing. Maximum slab area within control joints shall be restricted to 56 square meter (600 square feet). Reinforce all reentrant corners of slabs with two (2) #13 (#4) by 1200 mm (4 feet) diagonally placed bars. Welded wire reinforcement shall be secured at mid-depth of slab by mechanical means such as precast concrete spacers or reinforcing chairs. All slab-on-grade shall be moist cured for a minimum of 7-days prior to curing by curing compound for another 3-weeks of curing. Curing compound shall be dissipating type compatible with any floor seal or floor covering adhesives.

6.c. Wood Construction. Wood structural members shall be limited to treated plywood roof and wall sheathing, treated plywood subflooring and wood blocking where wood surfaces or items cannot be attached directly to the steel framing. Non-wood substitutes for these members shall be subject to the approval of the Contracting Officer.

6.c.(1) Wood Treatment. All wood structural members, including subflooring, sheathing, backing, blocking, etc., shall be pressure treated for termite and decay protection in conformance with the applicable requirements of American Wood Preservers' Association (AWPA) Standards or approved equal. A certificate of compliance shall denote the treating process utilized and applicable standards. Each piece of treated material shall be labeled to indicate the preservative (or identified with a distinct colorant representative of the treatment) and the specified retention. All lumber treated with Disodium Octaborate Tetrahydrate (DOT), unexposed, shall have a minimum preservative retention of 0.005 kilogram per cubic meter (0.40 pounds per cubic foot) by assay. All products treated with DOT shall be stored off the ground away from standing water and protected with a water resistant top wrap/sheet. Treatment of Coastal Douglas fir lumber with chromated Copper Arsenate (CCA) is extremely difficult, per AWPA, and is not allowed (CCA is acceptable for treatment of plywood). All cuts, holes, notches,

splits, etc. made during the construction phase shall be field-protected with an EPA-registered solution in accordance with AWPB Standard M4-90.

6.c.(2) Plywood. Design stresses for plywood shall be in accordance with the allowable unit stresses in APA Plywood Design Specifications. Plywood that is used for floors or stair treads and landings shall be secured with 8d screw nails and glue.

6.c.(3) Warranty. The Contractor shall provide a written warranty for the pressure treatment effective from the date of acceptance of the houses. The warranty shall provide for replacement of all treated material which is damaged by subterranean termites within a period of three (3) years or is damaged by drywood termites, rot or decay within a period of five (5) years, up to a cumulative total of \$5,000 per DU. Warranty shall be provided by the chemical manufacturer and countersigned by the Contractor.

6.d. Reinforced Concrete. Concrete Requirements. All concrete shall conform to ACI Manual of Concrete Practice.

6.d.(1) Minimum concrete strength at 28 days:

6.d.(1).(a). Slabs on grade, unreinforced concrete and all reinforced concrete: 25 Mpa (3000 psi) with water-cement ratio not more than 0.45.

6.d.(1).(b). Minimum concrete thickness:

Slabs on grade: 102 mm (4 in) thick unless otherwise specified (i.e. garages and driveways). At interior bearing walls, slabs shall be thickened to a minimum of twice the normal slab thickness. Interior thickened slabs shall be reinforced with a minimum of two #13 (#4) continuous bottom rebars. At slab edges supporting bearing walls, the edge shall be thickened so that the bottom of the thickened edge is a minimum of 300 mm (12 inches) below the exterior finish grade. The width of the thickened edges supporting bearing walls shall be as required to support the applied loading, but shall not be less than 300 mm (12 inches). Thickened slab edges supporting bearing walls shall be reinforced with a minimum of one #13 (#4) continuous top and two #13 (#4) continuous bottom rebars. At slab edges not supporting bearing walls, the edge shall be thickened so that the bottom of the thickened edge is a minimum of 150 mm (6") below the exterior finish grade. The width of non-load bearing thickened slabs shall not be less than 150 mm (6 inches). Thickened slab edges not supporting bearing walls shall be reinforced with a minimum of one #13 (#4) continuous top and bottom rebars. Should geotechnical and structural concerns require dimensions greater than those given above, the greater dimensions shall govern.

6.d.(2) Structural members. The thickness of all structural members shall conform to ACI "Building Code for Reinforced Concrete".

6.d.(2).(a). The minimum yield strength (F_y) of reinforcing shall be 275 MPa (40,000 psi).

6.d.(2).(b). Samples of concrete for air, slump, unit weight, temperature and strength tests shall be taken in accordance with ASTM C 172. Samples for strength tests for each strength of concrete placed each day shall be taken not less than once a day, nor less than once for each 115 cubic meters (150 cubic yards) of concrete, nor less than once for each 465 square meter (5,000 square feet) of surface area for slabs. Cylinders shall be molded and cured in accordance with ASTM C 31 and tested in accordance with ASTM C 39. Temperature of freshly mixed concrete shall be determined in accordance with ASTM C 1064 at every slump test or when test specimens are taken. All costs for concrete sampling and testing shall be borne by the Contractor.

6.e. Miscellaneous Metal Items. All railings, handrails, fences, anchor bolts, plates, and steel embedded in concrete, metal studs and runners, and other miscellaneous metal items shall be galvanized. All damaged galvanized areas not embedded shall be repaired with galvanizing repair

compound. All metal items listed above that are exposed to the weather or exterior shall be hot-dip galvanized or coated with inorganic zinc primer.

6.f. Light Gage (Cold Formed) Steel Construction. Design and construction shall be in accordance with the AISI Cold-Formed Steel Design Manual (1996) and AISI Publication NO. RG-934, "Low Rise Residential Construction Details." In addition, design and construction shall comply with all recommendations made in the Structural Engineers Association of Hawaii (SEAOH) Publication, "Structural Guidelines for Detailing of Cold-Formed Steel Framing."

6.f.(1) Walls. Metal studs for non-bearing partitions shall be 0.6 mm (25 gage) minimum in thickness, 65 mm (2-1/2"), 89 mm (3-1/2") or 92 mm (3-5/8") at 600 mm (24 in.) OC. Metal studs for bearing walls shall be 1.0 mm (20 gage) minimum in thickness, 89 mm (3-1/2") or 92 mm (3-5/8") at 600 mm (24 in.) OC with 1.0 mm (20 gage) top and bottom runners. For shear walls the following requirements apply: End studs shall be 1.5 mm (16 gauge) minimum, 89 mm (3-1/2") or 92 mm (3-5/8"). Top and bottom runners shall be minimum 1.5 mm (16 gauge). Uplift of corners shall be prevented by installation of structural angles bolted to structural elements below. Shearwall service load values shall be obtained from UBC/ICBO approved load tables.

6.f.(2) Roof. Roof truss members shall be minimum 1.0 mm (20 gauge) in thickness, except that roof truss members for standing seam metal roof systems shall be 1.6 mm (16 gauge) minimum. Roof sheathing shall be exterior rated, minimum 13 mm (1/2") plywood.

6.f.(3) Floors. Floor joists shall be minimum 1.3 mm (18 gage) in thickness, spaced at 300 mm (12"), 400 mm (16") or 600 mm (24") OC. Subflooring shall be 29 mm (1-1/8 inches) tongue and groove treated plywood. Subflooring of 19 mm (3/4 inch) may be used only if solid blocking between joists is used to provide load sharing to adjacent joists. Floor systems shall be designed to limit live load deflections to L/360 for spans up to 4.5 m (15 feet), decreasing linearly to L/480 for spans up to 7.3 m (24 feet) and beyond.

6.f.(4) Staircase. For two-story dwelling units, the staircase shall be framed utilizing minimum 1.0 mm (20 gage) stringers and joists.

6.f.(5) Fasteners. All screws, bolts, anchor bolts and expansion shields shall be stainless steel or finished with zinc, cadmium or co-polymer coatings. Pneumatically driven pins or nails will not be permitted. All welded connections shall be designed in accordance with Section E of the AISI Specification. All welding shall be accomplished in accordance with AWS D1.3 standards. All weld areas shall be re-touched with the appropriate paint or cold galvanized to retain corrosion resistance.

6.f.(6) Protective Coating. Exposed light gage steel members will not be allowed. All light gage steel used for exterior applications shall have minimum G-90 hot dip zinc coating in accordance with ASTM A 525. Exterior applications include all steel members directly supporting exterior siding and roof sheathing. Interior applications shall have a minimum, G-60 hot dip zinc coating in accordance with ASTM A 525. A vapor barrier shall be provided between exterior siding and studs.

6.g. Special Inspection. The design structural engineer shall fully inspect and approve the steel framing for the prototype buildings. Subsequent follow-up weekly inspections (once a week for all buildings) will be conducted by a cold formed steel framing inspector, provided by the contractor and approved by the Contracting Officer. Weekly inspections shall be conducted throughout the steel framing phase of work. The steel framing inspector shall be a qualified person with a minimum of three years of experience in the design and/or construction of residential cold formed steel framed structures. The steel framing inspector shall be duly authorized by the structural designer, to insure contractor compliance with the approved prototype, drawings and specifications. The steel framing inspector shall keep complete record of all inspections and shall submit weekly written reports to the Quality Control System Manager certifying the quality of the cold formed steel framing construction.

7. UNIT DESIGN - THERMAL PERFORMANCE.

7.a. Thermal Characteristics. Housing unit construction shall provide at least the minimum R values / maximum U values indicated in Table 7-1 for the appropriate weather region. R and U values shall be calculated in accordance with ASHRAE methods.

TABLE 7-1 - THERMAL CHARACTERISTIC REQUIREMENTS^{1, 2}

Weather Region	Wall R Value ³	Ceiling/Roof R Value ⁴	Crawl Space R Value ⁵	Basement R Value ⁶	Slab on Grade R Value ⁷	Door R Value ⁸	Glazed Openings U Value ⁹	
							Window	Door
10	2.2 [13]	5.3 [30]	2.2 [13]	.9 [5]	2.2 [13]	.9 [5]	2.9 [0.50]	2.2 [0.38]

Note¹: Metric R values are in square meter-kelvin (K)/watt. (English R values are bracketed, and are in square foot-°F/BTUH). ($R = 1 / U$)

Note²: R values listed represent the minimum acceptable insulation values for each construction type. Listed U values represent the maximum thermal conductance allowed for windows and doors. Listed values do not include allowance for surface air films.

Note³: Requirements for opaque, exterior walls.

Note⁴: For buildings with ventilated attics, no credit may be taken for the roof construction. R value shall be computed for construction between conditioned space and ventilated attic or building exterior. Insulation for floors which extend over outside air spaces shall conform to the ceiling/roof requirements.

If cathedral ceilings are being used, the effective R-value of the overall roof area must meet the required "Ceiling/Roof" performance level. The effective R-Value of the overall roof area can be determined by calculating the weighted average of the R-Values of the different areas (based on the percentage of the total roof area each type covers). For example, If the Ceiling/Roof insulation required was R-38 and 25% of the ceiling was cathedral insulated to R-19, and then the required R-Value for the remaining roof would be: $(38 - 0.25 \times 19) / 0.75 = 44.33$, or R-45 (min.).

Note⁵: Requirements for crawl space exterior walls below uninsulated floors.

Note⁶: Requirements for basement wall insulation extending downward 3050 mm [10 ft] from outside finished grade, or downward from outside finished grade to basement floor, whichever is less.

Note⁷: Requirements for perimeter insulation. In Weather Regions 1 through 6, perimeter insulation shall extend 1220 mm [48 inches] down from the top of the slab, or down to the bottom of the slab then horizontally beneath the slab to a total distance of 1220 mm [48 inches]. In Weather Regions 7 through 11, perimeter insulation shall extend downward to a total distance of 610 mm [24 inches] as described above.

Note⁸: Requirements for opaque doors in exterior walls (insulated metal).

Note⁹: Window requirements for double pane, low emissivity glass windows as specified in paragraph 5.m of this STATEMENT OF WORK. Total Window (including glazing and frame) U

values as rated by the National Fenestration Rating Council (NFRC) shall be used. Glazing area in Weather Regions 1 and 2 shall be limited to 12 percent of the heated floor space. Glazing area in Weather Regions 3 through 11 shall be limited to 14 percent of the heated floor space. Solar Heat Gain Coefficient in Weather Regions 8 through 11 shall be limited to 0.40.

7.b. Thermal Insulation.

7.b.(1) Characteristics. Thermal insulation shall have a flame-spread rating of 25 or less and a smoke-development rating of 50 or less, exclusive of the vapor barrier, when tested in accordance with ASTM E84. A vapor barrier shall be provided on the warm side of exterior wall and ceiling insulation, except in humid areas as defined below. Polyurethane is allowed as an insulation material for slabs and outside concrete or unit masonry walls. It is prohibited as an injected insulation material in walls or floor cavities or within the building envelope.

7.b.(2) Humid Area Design. Interior surfaces of ceilings and exterior walls shall be covered with materials which allow escape of water vapor from inside the walls to prevent the growth of mold on interior surfaces. The vapor barrier in humid areas shall have a maximum perm rating of 0.5, and shall be located on the outside face of the exterior wall or ceiling insulation.

7.c. Air Infiltration.

7.c.(1) To limit air infiltration, the following joints in the building envelope shall be caulked, gasketed, weatherstripped or otherwise sealed: around window and door frames, between wall cavities and frames, between walls and ceiling/roof, between walls and floors, at access doors/panels, electrical receptacle boxes, at utility penetrations through walls, floors, and roofs, and at any other exterior envelope joint which may be a source of air leakage. These steps, in combination with provision of a continuous vapor barrier and sealed ductwork as specified in paragraphs 10.b and 10.d. shall constitute tight building construction.

8. UNIT DESIGN - PLUMBING.

The plumbing system shall be designed and installed in accordance with the National Standard Plumbing Code (NSPC). Inspection and testing of the plumbing system shall be performed as prescribed in the National Standard Plumbing Code. Additional consideration in the technical evaluation will be given to systems which incorporate measures beyond the requirements of this STATEMENT OF WORK which are designed to increase energy conservation, ease of maintenance, or occupant comfort such as water filtration and purification, higher efficiency water heating systems, higher grade plumbing fixtures materials, etc.

8.a. Water Piping. Under slab supply piping shall be limited to unit service entrance only. Service line to each housing unit shall be no less than 25 mm (1 inch) diameter and have a pressure regulating valve (PRV). All water piping shall be sized in accordance with methods outlined in the National Standard Plumbing Code, to limit water velocity in the pipe to 2440 mm/sec (8 ft/sec) unless a lower velocity is recommended by the plumbing fixture manufacturer(s). An isometric diagram of the water system shall be included in the design submittal. Under slab water supply piping shall be buried under subgrade soils at a minimum of 150 mm (6 inches). Provide brass identification tags, to designate the housing unit, on each service entrance shut-off valve.

8.a.(1) Copper tubing. Water piping under concrete slabs shall be copper tubing, type K, annealed conforming to ASTM B43. Joints under the slabs are prohibited. Copper tubing selected for interior water piping shall be type K or L copper conforming to ASTM B88. Fittings for soft copper tubing shall conform to ASME/ANSI B16.26, Cast Copper Alloy Fittings for Flared Copper Tubes, and for hard-drawn to ASME/ANSI B16.22, Wrought Copper and Copper alloy Solder Joint Pressure Fittings.

Solder joints shall be made with lead free solder. Water lines may be located in exterior walls, attic spaces, or crawl spaces. Connections between ferrous and copper pipes shall be made with dielectric unions or flanges. Provide water shut-off valve on exterior of each housing unit. Water chlorination procedure for hot and cold water lines shall be in accordance with AWWA M20.

8.b. Soil, Waste, Vent, and Drain Piping. Soil, waste, drain, and vent piping may be cast iron, copper, ABS or PVC suitable for installation in a residential waste, soil, vent, and drain system. Each fixture and piece of equipment, except water closets, requiring connection to the drainage system, shall be provided with a trap. Provide deep seal trapped drain for heat pump water heater condensate drain. Heat pump condensate drain piping shall be routed to sanitary waste system. All unfinished plumbing work, such as cleanouts, fittings, etc., exposed to finished rooms or spaces shall be concealed by an escutcheon plate or similar finished device. Building waste main lines shall be no less than 102 mm (4 inch) diameter. All soil, waste, and drain piping shall be sized in accordance with the methods outlined in the National Standard Plumbing Code. An isometric diagram of the sanitary sewer system shall be included in the design submittal.

8.b.(1) All below ground soil, waste, vent, and drain pipe and fittings shall be cast iron soil pipe, hub and spigot type conforming to ASTM A 74, Acrylonitrile-Butadiene-Styrene (ABS) conforming to ASTM D 2661, or PolyVinyl Chloride (PVC) conforming to ASTM D 2665. Pipes passing through basaltic termite barrier and concrete shall be cast iron. Annular space between the pipe and cast iron sleeve shall be filled with non-hardening sealant.

8.b.(2) Above ground soil, waste, vent, drain pipe and fittings shall be cast iron soil pipe, hubless type, conforming to CISPI 301-82, ABS conforming to ASTM D 2661, or PVC conforming to ASTM D 2665. The drain pipe and trap inside cabinets shall be not less than 17 B&S gauge (1.1 mm) (0.45 inch) chrome-plated or nickel-plated copper alloy.

8.b.(3) The routing of soil and waste piping under concrete slabs shall be minimized as much as possible to reduce future replacement costs. Plumbing cleanouts located at or adjacent to the front door entrance are not permitted. Soil, waste, and drain piping installed below floor slabs shall be service weight hub and spigot cast iron or plastic pipe.

8.c. Plumbing Fixtures. Fixtures shall be provided complete with fittings, and chromium- or nickel-plated brass (polished bright or satin surface) trim. All fixtures, fittings, and trim in a project shall be from the same manufacturer and shall have the same finish.

8.c.(1) Plumbing shall meet the following criteria:

8.c.(1).(a) Plumbing Fixtures. All plumbing fixtures shall be the standard catalogued product of manufacturers regularly engaged in production of such materials or equipment and shall be manufacturer's latest standard design. All plumbing fixtures in family housing units designated as accessible for the handicapped shall be disabled accessible type conforming to UFAS. Controls and operating mechanisms for disabled accessible plumbing fixtures shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls shall be no greater than (5 pounds) force. Faucet handles shall be of the same design in all bathrooms. Exposed metal water and drain piping, fittings, and trimmings shall be chrome-plated or nickel-plated brass with a polished bright surface. Exposed traps shall be chromium-plated, adjustable-bent tube, not less than 17-gauge brass. Pipes concealed in cabinets are considered concealed pipes, except the kitchen sink and lavatory water, drain pipes and traps inside cabinets shall be chrome plated. Escutcheons shall be provided at finished surfaces where bare or insulated piping passes through floors, walls, or ceilings. Exterior wall piping penetrations shall be caulked and escutcheons provided. Exposed drain and hot water piping in handicapped facility must be insulated to prevent injury/burns.

8.c.(1).(b) Faucets shall be single-control type, with seals and seats combined in one replaceable cartridge designed to be interchangeable among lavatories, bathtubs and kitchen sinks or having replaceable seals and seats removable either as a seat insert or as a part of a replaceable valve unit. Water flow shall be no more than .158 L/s (2.5 gpm) from kitchen faucets and not more than .126 L/s (2.0 gpm) from lavatory faucets..

8.c.(1).(c) Shower/bath combination shall be controlled by a diverter valve, be a single handle control type with integral screwdriver stops and adjustable temperature limit stop to control the maximum hot water temperature. Baths and shower/bath combinations shall be provided with waste fitting pop-up, concealed with all parts removable and renewable through the overflow and outlet openings in the tub. Showers and shower/bath combinations shall be equipped with a combination valve and flow control device to limit the flow to 0.158 L/s (2.5 gpm) at pressures between 137.9 to 413.7 kPa (20 and 60 psi).

8.c.(1).(d) Piping shall be concealed. Individual shutoff or stop valves shall be provided on water supply lines to all plumbing fixtures except tubs and showers. (The screwdriver stops required for shower and tub valve assemblies are not considered individual shutoff valves). Shutoff valves shall be provided for each bathroom group. In multi-story units, additional consideration shall be given in the technical evaluation to designs which provide separate shutoff valves for each floor.

8.c.(1).(e) Fixtures shall be water conservation type, in accordance with the National Standard Plumbing Code.

8.c.(1).(f) Vitreous china plumbing fixtures shall conform to ASTM/ANSI A112.19.2, Vitreous China Plumbing Fixtures. Stainless steel fixtures shall be in accordance with ASTM/ANSI A112.19.3, Stainless Steel Plumbing Fixtures (residential design). Plastic fixtures shall conform to ASTM/ANSI Z124. Enameled cast iron plumbing fixtures shall comply with ASTM/ANSI A112.19.1, and enameled steel fixtures shall comply with ASTM/ANSI A112.19.4.

8.c.(2) Water Closets. Water closets shall have regular bowl, elongated bowl preferred, with inclined tank, close coupled siphon jet, floor outlet with wax gasket, closed-front seat and cover, and an anti-siphon float valve. Water consumption shall be no more than 6 L (1.6 gal) per complete flushing cycle. Water closet trim shall conform to ASTM/ANSI A112.19.5, Trim for Water-Closet Bowls, Tanks, and Urinals (Dimensional Standards). Disabled units shall provide water closet height to conform to the UFAS.

8.c.(3) Lavatories. Lavatories shall be rectangular counter top type, minimum 508 by 457 mm (20 by 18 inches) in size or oval minimum 480 by 410 mm (19 by 16 inches) in size. Lavatories shall be vitreous china, cast iron rimless type (without rings), or cross-link acrylic molded counter top with integral bowl. Lavatories shall have pop-up drains. Lavatories for disabled accessible units shall be installed in conformance to the UFAS. Lavatories integral with countertop constructed of solid polymer equal or better than Corian is preferred.

8.c.(4) Bathtubs. Bathtubs shall be slip resistant and shall be constructed of enameled cast iron or enameled formed steel. Enameled cast iron bathtubs are highly preferred. Manufacturer shall certify that the bathtubs are lead free. Concealed combination shower and bath supply fitting shall be controlled by a diverter valve. Supply valves shall be a single handle control type and accessible for maintenance. Bathtub shall be provided with integral screwdriver stops. A flow control device shall be provided to limit the flow to a maximum of .158 L/S (2.5 gallons per minute). Shower spray unit with a hose at least 1,524 mm (60 inches) long that can be used both as a fixed shower head and as a hand-held shower shall be provided for disabled accessible units. Pop-up waste fitting shall be copper alloy with all parts removable and renewable through the overflow and outlet openings in the tub.

8.c.(4).(a) Where tubs are installed in an end-to-end configuration in adjacent bathrooms, the shower valve faucet end of the tubs shall not be back to back, but shall be located at opposite ends of the tubs to allow for maintenance and repair.

8.c.(5) Showers. Shower stall shall be provided with concealed shower bath fittings and integral stops. Shower shall be controlled by a single handle mixing type faucet with anti-scalding feature meeting the requirements of ASSE 1017-1986. Shower bath valves shall be accessible for maintenance.

8.c.(6) Kitchen Sinks. Kitchen sinks shall be Type 302 stainless steel, 20-gauge minimum, seamless drawn, with spray fitting P-trap, and sound deadened. Sinks shall be double bowl, self-mounting without mounting rings, complete with cup strainer and plug strainer and plug shall be eliminated where food waste disposers are provided. Sink shall be provided with an opening for air gap fitting from dishwasher discharge pipe. Provide single handle lever swing spout faucet. Minimum overall size shall be 813 mm by 533 mm by 184 mm (32 inches by 21 inches by 7-1/4 inches), except 165 mm (6-1/2 inch) deep sink is allowed in units designed to accommodate the disabled (see kitchen sink cabinet detail Fig. 51 of UFAS). Kitchen sink faucets shall be a water saving type with built-in flow restrictor to limit the flow to a maximum of .158 L/S (2.5 gallons per minute).

8.d. Clothes Washer Connections. Drainage and hot and cold water supply shall be provided for automatic clothes washers. Washer connection, complete with 50 mm (2-inch) drain, 20 mm (3/4 inch) hose thread supplies shall be provided in standard manufactured recessed wall box with single-face plate. Boxes shall be constructed of plastic or sheet steel. Steel boxes shall have a corrosion-resistant epoxy enamel finish. Boxes shall be mounted a minimum 865 mm (2 ft-10 inches) above the finish floor. Electrical outlets for both washer and dryer shall also be provided. Water hammer arrestor shall be provided on the cold and hot water supply to the clothes washer.

8.e. Hose Bibbs. Hose bibbs shall be provided at the front and rear of each building, for each ground level living unit. Hose bibbs and lawn faucets shall be supplied with an integral vacuum breaker and shall be attached to the dwelling unit and connected down stream of the dwelling unit shutoff valve. A brass nipple shall be used at the connection of the hose bibb to the piping.

8.f. Cleanouts. Cleanouts shall be provided at each change in direction of sanitary sewer lines, at the intervals specified in the National Standard Plumbing Code, and at the building service entrance. All cleanouts shall be permanently accessible. Ground cleanouts shall be installed in a 375 mm by 375 mm (15 inch by 15 inch) concrete pad, flush with grade.

8.g. Water Heaters: Water heaters shall have round, glass lined tanks, and shall be installed with an integral insulation wrap with a minimum R value of 5. Access shall be provided in the wrap for service and maintenance openings. Storage water heaters that are not equipped with integral heat traps and having vertical pipe risers shall be installed with heat traps directly on both the inlet and outlet.

Circulating systems need not have heat traps installed. Hot water piping for the first 3050 mm [10 ft.] downstream of the water heater shall be insulated. Water heaters shall be sized in accordance with Table 8-1 for a 32° C [90° F] rise. Water heater energy factors shall meet or exceed the minimum requirements of 10 CFR 430. Technical proposals which offer water heaters that exceed the minimum energy efficiency requirements listed herein will be considered more advantageous to the Government than those proposals which offer lesser energy efficiency or which merely meet minimum requirements. Monetary rebates offered by Hawaiian Electric Company for use of higher efficiency water heaters will go to the Installation (Directorate of Public Works, Army).

TABLE 8-1 - WATER HEATER SIZING

Requirements by Fuel Type	2 BR	3 BR	4 BR		5 BR	
	1 Bath	2 Bath	2 Bath	3 Bath	2 Bath	3 Bath
Electric:						
Storage (L [gal])	114 [30]	189 [50]	189 [50]	250 [66]	250 [66]	250 [66]
1 hour draw (L [gal])	167 [44]	273 [72]	273 [72]	333 [88]	333 [88]	333 [88]
Recovery (L/h [gph])	53 [14]	83 [22]	83 [22]	83 [22]	83 [22]	83 [22]

Note¹ : Storage capacity, input, and recovery may vary with manufacturer. Any combination or the above which produces the required hour draw will be acceptable.

8.g.(1) Electric Type: Electric type water heater shall be used as hot water storage tank for heat pump water heater or solar water heater. Electric type water heaters shall conform to UL 174, water heaters, household electrical storage tank type. Electric water heaters, 303L (80 gallons) or less, shall have a maximum power input of 16.2 MJ (4,500 watts) per element and shall be provided with dual heating elements. The size, capacity, voltage, and combined wattage of heating elements shall be not less than indicated. Dual element water heaters shall be equipped with an interlocking device (block switch) which shall prevent the two heating elements from operating simultaneously. Provide a shut-off valve at cold water make-up line to the water heater and hot water supply line leaving the water heater. Flexible dielectric connectors or flexible connectors and separate dielectric unions shall be used for connecting cold and hot water lines to the water heater. Installation of relief valve and discharge piping shall be in accordance with the National Standard Plumbing Code.

8.g.(2) Heat Pump Water Heater: All water heating heat pump units shall carry nationally recognized independent laboratory safety testing and performance certification. Units shall have a minimum Coefficient of Performance (COP) of 2.5 when tested in accordance with Gas Appliance Manufacturers Association Efficiency Test Standards. All electrical and refrigeration components shall be UL listed or recognized devices. The size and capacity of the heat pump shall not be less than that which is indicated for electric water heaters in paragraph above. Hot water storage tank shall be wired with a heating element power switch. The switch shall be enclosed in a separate lockable enclosure. All lockable switch enclosures shall be keyed alike. Keys shall be turned over to DPW via the contracting officer. When heat pump is installed, this switch will be in the off position. Heat pump water heater shall be protected from the environment and shall be so located as to reduce the noise level in the living room and bedrooms. The maximum allowable noise level is 40 to 45 DBA for the living room and the bedrooms and 50 to 55 DBA for all other living areas. Heat pump water heater storage area shall not be considered as part of the family housing unit storage area when determining storage area requirements. Adequate ventilation shall be provided for heat pumps to insure maximum efficiency. Refrigerant used shall have an Ozone Depleting Potential (ODP) of 0.05 or below. Six (6) copies of the operation and maintenance manuals shall be provided to the Government prior to incremental turnover of units. Contractor shall provide minimum 2 hours of operation and maintenance training to government personnel. Heat pump shall be controlled by thermostat sensing water temperature in the storage tank. Installation shall be in accordance with the manufacturer's recommended installation instructions.

8.g.(3) Digital Time Switch: Digital time switch shall be provided to energize/de energize the heat pump water heater control circuit during the predetermined time periods. The electronic time switch

shall be a 7 day programmable type with minimum 2 "on" and 2 "off" preset schedule switches per 24 hour period. The time switch shall be UL listed. The time switch shall be provided with rechargeable batteries with a built-in charger.

8.g.(4) Solar Water Heater: Instead of the heat pump water heater, solar water heater may be provided at the contractor's option. The solar water heater system shall be arranged for preheating of domestic water using flat plate liquid solar collectors. System components shall include a solar collector array, storage tank, pumps(s), automatic controls, instrumentation, interconnecting piping and fittings, and accessories required for the operation of the system. Electric water heater specified under paragraph 8.g.(1), Electric Type satisfies the storage tank requirement. The solar water heater shall satisfy a minimum 50% of the annual domestic hot water heating energy demand. Materials and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of such products and shall essentially duplicate items that have been in satisfactory use for at least 2 years prior to the proposal date. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site. Six (6) copies of the operation and maintenance manuals shall be provided to the Government prior to incremental turnover of units. Contractor shall provide minimum 4 hours of operation and maintenance training to government personnel.

8.h. Garbage Disposer and Dishwasher. Necessary water, waste, and vent piping and air gap fitting shall be provided, as applicable, and final connection for garbage disposers and dishwashers shall be made in compliance with applicable standards. Water hammer arrestors shall be provided on the water supply lines for the dishwasher. $\frac{3}{4}$ horse power motor is required for the garbage disposer.

8.i. Water Hammer Arrestors. Shock or water hammer arrestors conforming to Plumbing Drainage Institute Standards shall be provided in the hot and cold water supply lines to the clothes washer or dishwasher and any other quick acting valve installed on the water supply lines. The arrestors shall be of the diaphragm, floating piston or bellows type. Air chambers are not acceptable. The water hammer arrestors shall be made accessible for maintenance. Any access panels shall be installed in compliance with the UBC.

8.j. Flushing of Building Water Systems. After the water heater and/or heat pump has been installed, each faucet shall be opened (with hot and cold supply) to ensure that all aesthetically displeasing substances has been flushed out of the system.

9. UNIT DESIGN - ELECTRICAL.

9.a. Conformance to Code. The electrical system shall be designed in compliance with the rules and recommendations of ANSI C2, National Electrical Safety Code (NESC) 1997 edition, and NFPA 70, National Electrical Code (NEC) 1999 edition, and applicable local codes.

9.b. Electrical Service

9.b.(1) Electrical system characteristics for building services shall be 120/240 volts, single-phase, 3-wire, 60 Hertz, grounded neutral.

9.b.(2) Overcurrent protection shall be provided for each family housing unit feeder in multi-family dwellings. Service entrance equipment shall be weatherproof and grouped together on the outside of the building. The service entrance equipment shall include sockets for electric watt-hour meters. Provide locking seal on meter socket covers. Meter socket shall be located in an area readily accessible by service personnel. Manual by-pass jumper plates for each socket shall be provided. Meter sockets for each family housing unit within a building shall be grouped at one location at the building. Meter sockets shall have a cover plate lock on the locking ring to prevent removal of the locking ring by unauthorized personnel. Service entrance conductors for the multiple family housing units shall be sized in accordance with the National Electrical Code. Individual family housing unit feeders shall be not less than 150 amperes. Service entrances, and panels shall be enclosed or sight screened. Service feeders shall be underground.

9.c. Loadcenters. Loadcenters shall have a 150A minimum main circuit breaker and shall be rated not less than 150 amperes, mounted in the interior walls, readily accessible to the tenant, and located in utility area on the main or first floor. Offset a minimum of 400 mm (16 inches) horizontally back-to-back loadcenters. No recessed loadcenters are to be located in party walls and fire walls. Loadcenters shall have separate neutral and ground buses. Loadcenters shall be circuit breaker type installed in painted galvanized steel recessed, dead-front enclosures. A minimum of two (2) spare circuit spaces in the loadcenter shall be provided per family housing unit. Individual circuits shall be provided for the window air conditioning unit outlets. The minimum Amps Interrupting Current (AIC) rating of load centers shall be 10,000.

9.d. Outlet Circuits. Lighting and convenience outlets shall be on separate circuits. Convenience outlets shall be grounded, duplex type, 2 pole, 3 wire, rated 15 amperes at 125 volts, except that outlets provided for specified appliances shall be of the appropriate type and rating. Receptacles shall be grounded and flush mounted in walls and partitions. All receptacles requiring ground fault protection shall be integral with the receptacle. Outlets on party walls shall be offset 610 mm (24 inches) to maintain integrity of the fire wall and sound deadening rating of the wall.

9.e. Conduit and Wiring. Conduit and wiring shall not be run in concrete slabs-on-grade. Where runs are below concrete slabs-on-grade and in direct contact with earth or fill, conduit shall be of the coated rigid steel thickwall conduit, coated intermediate metal conduit or Schedule 40 polyvinyl chloride (PVC) type. Elsewhere, conduit where required shall be either of the galvanized thickwall conduit, intermediate metal conduit, or electrical metallic tubing (EMT) type, except that EMT shall not be installed in concrete, exposed to the weather or in other wet locations.

9.f. Calculations and Drawings. Complete single line diagrams shall be provided with calculations of available short circuits and voltage drops on branch circuits. Lighting calculations shall also be provided. Load calculations for each dwelling unit shall conform to Article 220 of the NEC.

9.g. Exterior Lighting. Provide energy efficient high quality lighting for each unit. The minimum efficiency standard for lighting is 50 lumens/watt except for closet and storage spaces. This efficiency can be achieved with fluorescent and compact fluorescent lighting. Lamps shall be of low mercury type that meets EPA's TCLP (Toxic Characteristic Leaching Procedure) tests and are classified as non-hazardous waste. Lighting must also be color corrected with a Color Rendering Index (CRI) of 60 or better. Illumination levels shall conform to IES standards. Provide a minimum of one lighting fixture in each dwelling unit's entry, garage, closets/storage spaces 900 mm (3 ft) and greater in depth, and

patio/balcony area(s). Entry and patio luminaires shall be low wattage fluorescent type (9 watts) and be photocell operated. Provide manual override switches located in the dwelling unit interior that will allow the occupants the option to turn off the entry and patio lights. For individual garage without door, the lighting shall be controlled by three-way switches located in garage and within each family housing unit. Light fixtures in storage spaces shall each be provided with an individual wall mounted light switch. Provide photocell operated lighting for common trash areas. All luminaires shall be grounded to conform with Article 410 of the NEC and shall be rated for the environment to which the luminaires are exposed. Selection of luminaires shall be based on energy-savings and aesthetics. Outdoor luminaires shall be UL listed as suitable for wet locations and shall have vandal-proof polycarbonate type lens or otherwise impact resistant plastic lens. All luminaires shall be complete with lamps. Fluorescent and high intensity discharge luminaires shall be enclosed with lens.

9.g.(1) Building Security Lights. Outdoor 70-watt high pressure sodium luminaires shall be provided on the sides of each building to illuminate the perimeter of the building. Quantity and location of fixtures shall be situated to eliminate shadow areas where intruders could remain undetected, yet be coordinated with the architectural features of the structure to minimize spill light into the windows of the dwelling unit. Luminaires shall be photocell controlled. For the security lights circuit, an enclosed weatherproof circuit breaker shall be provided at the service entrance equipment. The circuit breaker shall be connected load side of the service disconnecting means and line side of the provisions for future metering of individual family housing units.

9.h. Interior Lighting and Switched Outlets.

9.h.(1) Efficiency. Interior lighting will be both efficient and color corrected. Color Rendering Index (CRI) of 85 or better and a standard lighting color of 3500 K are required. Fluorescent luminaires shall have rapid start, energy saving, electronic ballasts with sound rating "A". Lamps shall be of low mercury type that meets EPA's TCLP (Toxic Characteristic Leaching Procedure) tests and are classified as non-hazardous waste. For 1220 mm (4 ft) fluorescent light fixtures, provide T8, 32 watt lamps. Polystyrene lens are not acceptable. Acrylic diffusers shall be provided. Recessed fluorescent luminaires shall have 0.026-inch minimum thickness for metal housing. Surface mounted fluorescent luminaires shall have 0.032-inch minimum thickness for metal housing. Luminaires on ceilings less than 2250 mm (7 feet-6 inches) above the floor shall be recessed flush type unless recessed luminaires will result in a penetration of the infiltration membrane between the dwelling unit's interior and exterior or adjoining dwelling unit. Minimum efficiency standard for lighting (except for storage and closet spaces, where incandescent lamps are allowed) are as follows:

9.h.1.(a) Fluorescent tubes 1200 mm (4 ft) and longer: 90 lumens/watt.

9.h.1.(b) Fluorescent tubes less than 1200 mm (4 ft): 80 lumens/watt.

9.h.1.(c) Compact fluorescent lamps: 50 lumens/watt.

9.h.1.(d) Other lamp types: 50 lumens/watt.

9.h.(2) Dining Room. A ceiling mounted dining room light shall be provided. The luminaires shall be located so that the occupant's dining tables can be placed squarely under the luminaires with a walk space between the table and wall or other dining room furniture. Fixtures designed for incandescent use with globe type bulbs are acceptable when used with the matching globe type compact fluorescent.

9.h.(3) Kitchen. The general lighting intensity in kitchens shall be 320 to 540 Lx (30 to 50 footcandles) and shall be provided by fluorescent light fixtures. Supplementary fluorescent lighting shall be provided at the sink and under one of the wall cabinets for a work center to produce a composite lighting level of 800 Lx (75 footcandles) using either down-lights, fixtures surface mounted below wall cabinets or wall mounted fixtures (1500 mm (5 ft) and higher above the floor) as appropriate. Kitchen range hood shall be provided with a light, fan, and switches.

9.h.(4) Living Room. In the living room, wall switch operated luminaires shall be provided. If the ceiling height is 2400 mm (8 feet) or more, luminaires may be provided integral with the ceiling fan. In the

living room, a minimum of two (2) outlets shall have the top half operated by a wall switch at the main point of entrance to the room. Electrical provisions for a ceiling fan in the living room shall be provided.

9.h.(5) Bedrooms. Wall switch operated luminaires shall be provided. If the ceiling height is 2400 mm (8 feet) or more, luminaires may be provided integral with the ceiling fan. Electrical provisions for a ceiling fan in the master bedroom shall be provided.

9.h.(6) Bathrooms. Provide two fluorescent luminaires in bathrooms; one above the vanity area and the other centrally located to provide adequate illumination for the bathtub area. Exhaust fan shall be connected to the wall light switch. Switches shall not be accessible from the bathtub nor shower. Electric wall heaters or heat lamps shall not be provided. Luminaires shall not be provided with integral outlet.

9.h.(7) Other Spaces. Provide wall switch operated luminaires for each hallway, stairway, foyer, and walk-in closet. Provide 3 way switches at both end of halls that are 3000 mm (10 ft) or greater; at either side of foyers; at the top and bottom of stairs; and at each entry way for those rooms which have 2 entry doors. Provide 4 way switches as required for spaces that have 3 points of entry.

9.i. Smoke Detectors. Smoke Detectors which are located within the living unit and which sound alarm only within the unit are not required to be transmitted to the fire department. Automatic smoke detectors of the multiple station alarm type shall be provided in each family housing unit adjacent to each sleeping area, in each bedroom and on each additional living floor level of the family housing unit. Where gang storage cubicles occupy the basement area of multi-family buildings, one additional detector shall be provided to serve the basement area. Smoke detectors shall not be located in close vicinity of the bathroom entrance or kitchen to preclude false alarms. Detectors shall be of the ionization or photo-electric type conforming to the requirements of Underwriters Laboratories Standards No. 217. Detectors shall bear labels, indicating compliance with standards, by a recognized independent laboratory that maintains periodic inspection of production and testing of the detectors provided. Detectors shall be powered from an unswitched 120-volt branch circuit that does not serve a permanently installed motorized load. Detectors shall have a battery back-up system. Detectors shall be installed on the ceiling. Battery operated smoke detectors are prohibited. No signal needs to be sent to the fire department. Smoke detectors in all types of units shall be hardwired for power and interconnected so that activation of any smoke detector shall cause the audible alarm in all smoke detectors within the dwelling unit to sound. Firex model 0440 or approved equal smoke detectors shall be used. The designated disabled units shall provide smoke detector design so it is readily modifiable in accordance with UFAS/ADAAG.

9.j. Door Chimes. Push buttons shall be provided at front entrances to family housing units. The system shall include wiring, push buttons, transformer and chimes. System shall be designed for operation at less than 50 volts. An extra chime shall be placed in the corridor of the second floor for two (2) story family housing units. Splices in wiring shall be made only where they will be accessible upon completion of the building.

9.k. Branch Circuits and Convenience Outlets.

9.k.(1) General. Provide receptacle outlets in kitchen, family room, dining room, living room, bedrooms, and other areas of dwelling units in wall spaces 600 mm (2 ft) or more in width as required by the NEC. Ground fault circuit interrupter (GFCI) receptacles shall be 15A, 120V w/test and reset button integral with the receptacle. GFCI receptacles shall not be used in "feed thru" applications to protect downstream receptacles on the same branch circuit.

9.k.(2) Kitchen. Separate branch circuits shall be provided for the dishwasher, garbage disposer, freezer (occupant owned), range, microwave oven, and exhaust fan. Receptacles shall be provided for the freezer (occupant owned), refrigerator, microwave oven (occupant owned), and range. Garbage disposer shall be plug connected. Dishwasher and exhaust fan shall be hard-wired. The dishwasher and garbage disposer circuits shall utilize separate outlet boxes. A switch mounted above the counter backboard shall be provided for the garbage disposal. Duplex, ground fault circuit interrupter (GFCI)

receptacles shall be provided where installed to service countertop surfaces in accordance with the NEC. Two (2) or more 20-ampere small appliance branch circuits shall be provided in the kitchen and shall conform to NEC. Dryer and range circuits shall have a separate equipment grounding conductor per NEC 250-59 and 250-60.

9.k.(3) Living and Dining Rooms. Electrical provisions for a ceiling fan in the living room shall be provided. Provide a dedicated 20 ampere, 250 volt single grounding type outlet in the living room near a window opening for an occupant-owned window air conditioning unit.

9.k.(4) Master Bedrooms. Electrical provisions for a ceiling fan in the master bedroom shall be provided. Provide a dedicated 20 ampere, 125 volt single grounding type outlet in the master bedroom near a window opening for an occupant-owned window air conditioning unit.

9.k.(5) Bathrooms. A duplex, ground fault circuit interrupter (GFCI) receptacle shall be provided adjacent to the lavatory. Bathroom receptacle outlets shall be supplied by at least one 20-ampere branch circuit. Such circuit shall not have other outlets.

9.k.(6) Utility room. An outlet shall be provided for an ironing board.

9.k.(7) Hallway outside bedrooms. For hallways of 3000 mm (10 feet) or more in length, at least one duplex receptacle shall be provided .

9.k.(8) Garage. A weatherproof, duplex, ground fault circuit interrupter receptacle shall be provided .

9.k.(9) Patio. Weatherproof duplex, ground fault circuit interrupter (GFCI) receptacles shall be provided.

9.k.(10) Entrance. A weatherproof, duplex, ground fault circuit interrupter (GFCI) receptacle shall be provided near each entrance to each family housing unit.

9.k.(11) Appliance Requirements. Refrigerators shall operate on a 120-volt, 60 Hz, single phase circuit, plug/receptacle connected. Electric range shall operate on a 120/240-volt, 60 Hz, single phase, 50-ampere circuit, plug/receptacle connected.

9.l. Wiring. Conductors shall be copper. Aluminum conductors are not allowed. Conductors No. 10 AWG and smaller shall be solid, and those No. 8 AWG and larger shall be stranded. Unless indicated otherwise, all wiring, installed in conduit or electrical metallic tubing, shall be 600 volts, type THW, THWN, XHHW or RHW, except that grounding wires may be type TW. Remote-control and signal circuits shall be type TW, THW or TF, No. 14 AWG minimum. Nonmetallic-sheathed cables shall comply with UL 719 , type NM (or NMC). Service entrance cables shall comply with UL 854. All wiring shall be concealed. Maximum use shall be made of nonmetallic sheathed cable for branch circuit wiring.

9.m. Telecommunications System.

9.m.(1) Telecommunication Premise Wiring System Design: Features of the premise wiring system are as follows:

9.m.(1).(a). Prewiring of the building in accordance with Federal and National Standards

9.m.(1).(b). Use of unshielded twisted 8-conductor, 24 AWG, category 5e, solid copper wire throughout the building

9.m.(1).(c). Use of distribution device such as patch panels, 110 Blocks for all wiring administration. RJ21X or 66 Blocks shall not be used.

9.m.(1).(d). Star wiring architecture from the distribution device

9.m.(1).(e). One wire run per room

9.m.(1).(f). Two station wire pairs connected at every installed outlet

9.m.(1).(g). Wiring configuration of 8-position, category 5, telecommunications jacks

9.m.(1).(h). Use of an auxiliary disconnect outlet if necessary

9.m.(2) Telecommunications Outlets. One outlet shall be located in each of the kitchen area, living room, family room and each bedroom. Telecommunications outlets shall be 8 position, Category 5 flush mounted type, wired in the T568A configuration. Each outlet shall have a 4 pair Category 5 telecommunications cable in a concealed conduit. Wiring methods shall comply with EIA/TIA Standard 570, Residential and Light Commercial Telecommunications Wiring Standard. Cable and jacks shall be Category and EIA/TIA Standard 568A, Commercial Building Telecommunications Cabling Standard.

9.m.(3) Telecommunications Cabinet. A weatherproof telecommunications cabinet for each building shall be provided. The cable in conduit from each family housing unit shall terminate in the telecommunications cabinet located on an outside wall. Provide 110 termination blocks that are rated for Category 5e. The telecommunications cabinet cover shall be provided with means for padlocking, shall be accessible from the outside, and shall be permanently labeled "Telecommunications". The minimum cabinet size shall be as required for telecommunications service equipment needed for each size multi-family building. Two empty 53 mm (2-inch) conduit with pullwire shall be extended from the telecommunications cabinet to the underground telecommunications distribution system as described in paragraph SITE UTILITIES. Number and size of telecommunications cabinets shall be coordinated with DOIM. Mule tape shall be installed in all conduits from the cabinet to the underground telecommunications distribution system.

9.m.(4) Conduit and Wiring. Contractor shall provide minimum 21 mm (3/4") conduits, complete with telecommunications cables and standard T568A modular jack outlets for telecommunications service. Provide each outlet with a cable in conduit routed directly to the telecommunications cabinet. No section of conduit shall contain more than two 90 degree bends between pull points or pull boxes. During cable installation, the rated cable pulling tension shall not be exceeded and cable shall not be stressed such that twisting, stretching, or kinking occurs. Conduit and wiring shall not be run in concrete slabs-on-grade. Where runs are below concrete slabs-on-grade and in direct contact with earth or fill, conduit shall be of the coated rigid steel thickwall conduit, coated intermediate metal conduit or Schedule 40 polyvinyl chloride (PVC) type. Elsewhere, conduit where required shall be either of the galvanized thickwall conduit, intermediate metal conduit, or electrical metallic tubing (EMT) type, except that EMT shall not be installed in concrete, exposed to the weather or in other wet locations. Use of flexible plastic or metallic conduit is prohibited.

9.n. Cable Television System.

9.n.(1) Television Outlets. Flush mounted Television (TV) outlets shall be located in the living room, family room, and bedrooms. Outlets shall be Type F female plugs. Each outlet shall be cabled with a dedicated, unspliced, coaxial cable to a junction box located within the unit. An AC receptacle shall be located adjacent to the junction box. Unit TV wiring shall originate at the backboard and end at the junction box within the unit. See RFP attachment "TYPICAL BUILDING/DWELLING UNIT CATV LAYOUT" for preferred cable/conduit scheme for each building/dwelling unit. The outlets shall be prewired and pretested.

9.n.(2) Cabinet. A lockable, weatherproof, television terminal cabinet for each building shall be provided on an outside wall. Coordinate minimum size of cabinet and the type of termination requirements with Oceanic Cable and GTE Media Ventures. Each terminal cabinet shall be provided with a 19 mm (3/4-inch) termite treated plywood backboard and an insulated #6 AWG copper ground conductor with 900 mm (3 ft) slack in each cabinet. The cable in conduit from each family housing unit shall terminate to a common terminal board in the television terminal cabinet or as mutually agreed by Oceanic Cable and GTE Media Ventures. The cover for the cabinet shall be provided with means for padlocking, shall be accessible from the outside, and shall be permanently labeled "Television." Final

location of the television terminal cabinet shall be coordinated and mutually approved by Oceanic Cable and GTE Media Ventures. For each building, provide a conduit from the cabinet to the roof of the building as a provision for cable installation from antenna to cabinet by GTE Media Ventures to preclude GTE Media Ventures from routing exposed cable against the vinyl siding. Conduit shall be routed from cabinet concealed in wall up to roof line where it may be routed exposed by penetration of the frieze board or roof. Coordinate with GTE Media Ventures and provide appropriate weatherproof transition fitting from conduit to cable.

9.n.(3) Conduit and Wiring. For each building, all CATV cable shall be installed in a conduit. For Oceanic Cable and GTE Media Ventures, 75 ohm, RG-6/U, black, non-messenger, tri-shield, 80% aluminum braid, PVC jacketed coaxial cable shall be used for cable lengths under 45,700 mm(150 ft). For cable lengths greater than 45,700 mm(150 ft), the CATV cable shall be 75 ohm RG-11/U, bonded foil, shielded type which includes an inner layer of laminated tape of aluminum foil bonded to the conductors insulation with a layer of adhesive plus 60% aluminum braid, PVC jacketed coaxial cable. Conduit and wiring shall not be run in concrete slabs-on-grade. Where runs are below concrete slabs-on-grade and in direct contact with earth or fill, conduit shall be of the coated rigid steel thickwall conduit, coated intermediate metal conduit or Schedule 40 polyvinyl chloride (PVC) type. Elsewhere, conduit shall be either of the galvanized thickwall conduit, intermediate metal conduit, or electrical metallic tubing (EMT) type, except that EMT shall not be installed in concrete, exposed to the weather or in other wet locations. Use of flexible plastic or metal conduits are prohibited. All CATV conduit shall be concealed. Type of cable, type of tapoffs or splitters, and outlet boxes shall be coordinated with Oceanic Cable and GTE Media Ventures. The following is Oceanic Cable conduit capacity guidelines: $\frac{3}{4}$ "C = 1 to 2 each RG-6 w/pullwire, 1-1/4"C = 1 to 4 each RG-6 w/pullwire, 1-1/2"C = 1 to 5 each RG-6 w/pullwire.

9.n.(4) Coordination with Oceanic Cable and GTE Media Ventures. The Contractor is advised that both Oceanic Cable and GTE Media Ventures require drawings to be submitted for approval which show at a minimum, locations of outlets and boxes, routes, types and sizes of supporting facilities. The Contractor is also advised that these companies may decline to review drawings which they consider inadequate in detail. The Contractor shall be responsible for coordinating with Oceanic Cable and GTE Media Ventures to ensure what is proposed meets all their requirements. If any of Oceanic Cable and GTE Media Ventures requirements are not met, the Contractor shall provide what is required at no cost increase to Oceanic Cable, GTE Media Ventures, and/or the Government. The Contractor shall provide one week notice before conduit installation begins. Oceanic Cable point of contact is Mr. Roy Enomoto, (808) 625-8372; GTE Media Ventures point of contact is Mr. Richard Filanc, (808) 832-6590. For buildings that are to be demolished, coordinate with GTE Media Ventures for their removal of any of their existing antennas and Oceanic Cable for existing service drop termination and rerouting.

10. UNIT DESIGN - HEATING, VENTILATING, AND AIR CONDITIONING.

10.a. Air Conditioning Systems. Provide a dedicated electrical outlet for an occupant owned window type air conditioning unit in the living room and master bedroom.

10.b. Ductwork. Ductwork shall not be installed exposed in living areas. Range hood exhaust ducts shall be fabricated of galvanized steel or aluminum sheet metal in accordance with SMACNA standards.

10.c. Equipment Safety and Efficiency. All materials and equipment shall be the standard cataloged product of manufacturers regularly engaged in production of such materials and equipment, and shall be the manufacturer's latest standard design. Each major component of the heating (and cooling) system(s) shall have the manufacturer's information on a plate secured to the equipment. Equipment shall comply with the requirements of American Gas Association (AGA), American National Standards Institute (ANSI), Air Conditioning and Refrigeration Institute (ARI), American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM), Gas Appliance Manufacturers Association (GAMA), National Electric Manufacturers Association (NEMA), National Fire Protection Association (NFPA), Underwriters Laboratories, Inc. (UL) or other national trade associations as applicable. Technical proposals which offer equipment having energy conservation features, giving the equipment higher than minimum energy efficiency (as it relates to equipment operation costs), will be considered more advantageous to the Government than those proposals which offer lesser energy efficiency, or which merely meet minimum requirements.

10.d. Dryer Vents. A 100 mm (4 inch) diameter dryer vent shall discharge to the exterior, and provide connection to contractor furnished dryer (one dryer per vent). The vents shall be rigid aluminum sheet metal pipes with exterior wall cap and backdraft damper. Vent pipes shall be a maximum of 6100 mm (20 ft) long, with no more than three right angle elbows (with minimum radius of 150 mm (6 inches)), and have a maximum vertical run of 3660 mm (12 ft). Dryer vents shall not exhaust near entry doors, patio or balconies, carports, or garages, nor within 10 feet distance from the front door.. Dryer vents shall not run through non-accessible spaces or garages. Dryer vents shall not penetrate floor or roof. Wall caps shall be commercial grade fabricated of galvanized sheetmetal or aluminum.

10.e. Ceiling Fans. Ceiling fans shall be installed in the living room and master bedroom. Fans shall have nominal 1321 mm (52-inch) diameter fan blades. Fan shall be furnished with all metal fan housing and sealed maintenance free bearings. Fan shall have wooden blades, reversible motor and minimum 3-speed motor control. Fan speed shall be controlled by wall switch. Fan motor shall have a maximum power consumption of 0.375 MJ (105 watts) at high speed. Fan shall be UL listed. Fans may be low profile type to meet ceiling projection height as specified. Ceiling fans shall have 5 blades or more. Ceiling fan light fixtures (if provided) shall be energy conservation fluorescent (PL) lamps or circline lamps.

10.f. Bathroom and Kitchen Fans. Bathroom and kitchen fans shall be the exhaust type with exhaust ducted to the outside. Exhaust fans shall not discharge near the entry doors, patio or balconies, carport, or garages. Fans shall be tested and rated in accordance with HVI Standards, AMCA 210, and shall operate with 120 volt, single phase power supply. Provide back draft dampers on all discharge openings at the exterior wall or roof.

10.f.(1) Bathroom Exhaust Fans. Bathroom exhaust fans, wall or ceiling mounted, shall be of the centrifugal type, sized to give not less than 10 air change per hour in the space to be ventilated. Each fan shall have a removable front grille and discharge gravity backdraft damper. Control shall be by the wall light switch. Maximum allowable noise level for bathroom exhaust fans shall be 4 sones as installed.

10.f.(2) Range Hoods. Range hoods shall be ducted to outside. Range hood length shall not be less than the width of the range. Range hoods shall be complete with fans sized for not less than 78.7 L/s per meter of range hood (50 cubic feet per minute per linear foot of range hood), washable filter, and light switched separately from the fan. Fans shall be forward-curved centrifugal type and HVI certified for capacity and for a sound level not to exceed 6 sones at high speed as installed. Exhaust fan shall be two speed and mounted in range hood.

10.g. Exhaust fans. Exhaust fans shall be complete with appropriate switches, wall caps, eave vents, or roof jacks. Wall caps and eave vents shall be commercial grade fabricated of galvanized steel sheet or aluminum. Roof jacks shall be commercial grade fabricated of aluminum. Fans shall be accessible for replacement and repair.

11. CONTRACTOR PREPARED SPECIFICATIONS.

11.a. The successful offeror shall prepare a specification for all work included in the scope of work. The specification shall be tailored to this job. Inapplicable materials shall be deleted. Any reference, description, procedure or other matter required to develop a complete, accurate and concise specification shall be provided. The specification shall include but is not limited to:

11.a.(1). A description of the technical requirements

11.a.(2). Criteria for determining whether the requirements are met

11.a.(3). Quality control requirements and procedures

11.b. Specifications for features of the work shall be organized into divisions and sections in accordance with Construction Specifications Institute (CSI), Master list of titles and Numbers for the construction Industry, latest edition.

11.c. Individual specification sections shall be in the format of CSI, Section Format, A Recommended Format for Construction Specification Sections, latest edition. Exceptions are:

11.c.(1). Measurement Procedures and Payment Procedures shall only be used in those section(s) where rock excavation is specified. No other sections shall contain these subparagraphs of the paragraph SUMMARY.

11.c.(2). Except as otherwise noted in this paragraph, CONTRACTOR PREPARED SPECIFICATIONS, the paragraph SUMMARY shall not be used.

11.c.(3). Submittal requirements, submittal procedures and quality control procedures, construction operations shall be those contained in the attached Section 01320, Section 01330 including the submittal register, Section 01415, and Section 01451. These specification sections shall be incorporated into the contractor prepared specification packages without editing and shall be coordinated with all other specification sections prepared by the contractor.

11.d. Contractor prepared specifications shall be reviewed by the Contracting officer or his designated representatives during the design portion of the project. Contractor will incorporate all required changes after resolution of comments and prior to work initiation on the next phase of the project.

12. SUSTAINABLE DESIGN CONSIDERATIONS:

12.a. Sustainable design techniques shall be considered as they relate to site design, site engineering, unit design, and unit engineering. Techniques which conserve energy, improve livability, and can be justified by life cycle cost analysis as cost effective are encouraged. Integration of energy conservation systems with the housing unit's design (lighting, structure, mechanical systems, and aesthetics) is essential to facilitate livability and maximum energy savings. The following paragraphs define the goals and general objectives for inclusion of sustainable design listing is not all inclusive, and the techniques suggested may not be cost effective at a given location or site. Additional consideration in the technical evaluation will be given to designs which incorporate and identify Sustainable Design techniques included in the proposal.

12.b. Goals and Objectives of Sustainable Design.

12.b.(1). The overall USACE goal of Sustainable Design is to be environmentally responsible in the delivery of facilities. The key traditional elements for decision making in the facility delivery process are cost, quality and time. These elements need to be expanded to include the ecological and human health impacts of all decisions.

12.b.(2). Each project generates its own set of goals. However, sustainable design goals should apply to all projects. The goals for improving the environmental performance of facilities include: (a) use resources efficiently and minimize raw material resource consumption, including energy, water, land and materials, both during the construction process and throughout the life of the facility, (b) maximize resource reuse, while maintaining financial stewardship, (c) move away from fossil fuels towards renewable energy sources, (d) create a healthy and productive work environment for all who use the facility, (e) build facilities of long-term value, and (f) protect and, where appropriate, restore the natural environment.

12.c. Sustainable Design and Construction of the Built Environment. Design and construction of sustainable buildings should be in accordance with the following concepts:

12.c.(1). Site Work and Planning--Environmentally sensitive planning looks beyond the boundary of the project site to evaluate linkages to transportation and infrastructure, ecosystems and wildlife habitat and community identification. Site planning evaluates solar and wind orientation, local microclimate, drainage patterns, utilities and existing site features to develop optimal siting and appropriate low maintenance landscape plant material.

12.c.(2). Building Layout and Design--Optimize building size, and maintain an appropriate building scale for the environment and context of the building or a building component. Layout the rooms of a building for energy performance and comfort, and design for standard sizes to minimize material waste. Pay careful attention to the location of exterior windows. Avoid structural over-design and the resultant waste. Design components of the building environment for durability and for waste recycling.

12.c.(3). Energy--Building orientation and massing, natural ventilation, day-lighting, shading and other passive strategies, can all lower a building's energy demand and increase the quality of the interior environment and the comfort and productivity of occupants.

12.c.(4). Building Materials--Environmentally preferable building materials are durable and low maintenance. Within the parameters of performance, cost aesthetics and availability, careful selection and specification can limit impacts on the environment and occupant health.

12.c.(5). Indoor air Quality--Indoor air quality is most effectively controlled through close coordination of architecture, interiors and mechanical, plumbing, and electrical design strategies that limit sources of contamination before they enter the building. Construction procedures for IAQ and post-occupancy user guides also contribute to good long term IAQ.

12.c.(6). Water Usage--Site design strategies that maximize natural filtration of rainwater are desirable. Water conservation is enhanced by the use of low flow plumbing fixtures and water appropriate landscaping.

12.c.(7). Recycling and Waste Management--Waste and inefficiency can be limited during construction by sorting and recycling demolition and construction waste, reuse of on-site materials and monitoring of material use and packaging. Accommodating recycling into building design reduces waste while generating revenues.

12.c.(8). Building Commissioning, Operations and Management--Effective building commissioning is essential to ensure proper and efficient functioning of systems. Facilities operations benefit from energy and water saving practices, waste reduction and environmentally sensitive maintenance and procurement policies.

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BARRACKS, OAHU, HAWAII

LIST OF ATTACHMENTS

NUMBER	DESCRIPTION
1.	NOT USED
2.	OUTLINE SPECIFICATION
3.	FORMAT FOR REQUIRED CALCULATIONS
4.	PROPOSAL DRAWING FORMAT
5.	PROJECT AND HOUSING SIGNS
6.	PRELIMINARY SOILS INVESTIGATION REPORT
7.	LIST OF DRAWINGS
8.	INSTALLATION COMPATIBLE USE ZONE
9.	NEW CONSTRUCTION SITE PLAN
10.	NOT USED
11.	TYPICAL GTB DETAILS
12.	NOT USED
13.	SMALL DISADVANTAGED BUSINESS SUB CONTRACTING PLAN
14.	TREE PROTECTION DURING DEMOLITION AND CONSTRUCTION
15.	MISCELLANEOUS PROVISIONS
16.	GENERAL REQUIREMENTS
17.	NOT USED
18.	DUCT SECTION - PRIMARY ELECTRICAL TELECOMMUNICATIONS & CATV (FOR AREA J)
19.	DUCT SECTION - PRIMARY ELECTRICAL TELEPHONE & CATV (FOR AREA U)
20.	CATV REQUIREMENTS FOR AREA I AND J
21.	CATV REQUIREMENTS FOR AREA U AND W
22.	ABANDONED DUCTLINE REMOVAL - SOLOMAN SCHOOL/AREA U
23.	TYPICAL BUILDING/DWELLING UNIT CATV LAYOUT
24.	CADET SHERIDAN TREE PLANTING
25.	CROSSWALK & STOP LINE DETAIL

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LIST OF ATTACHMENTS

26. DD Form 1354

ATTACHMENT 2
OUTLINE SPECIFICATION

ATTACHMENT 2
OUTLINE SPECIFICATION

Proposal Number: _____
Project Name: _____
Location: _____

Project No.: _____
Architect: _____
Date: _____

INSTRUCTIONS

Describe all materials and equipment to be used. Include no alternates or equivalents. Show extent of work and typical details on drawings. Attach additional sheets if necessary to completely describe the work. The Cost Estimate will recognize quality products and materials in excess of acceptable minimums, when specified. Certain parts of the work cannot be put in their proper classification until more information about their materials and construction is known; therefore describe, under suitable categories below, the following: main service and other stairs, treads, risers, handrails, balusters, etc., sound insulation of partitions and floors separating apartments and between apartments and public spaces, utility conduits and tunnels, water proofing and drainage, utilities, and related insulation; retaining walls; garages and accessory buildings, and off-site improvements required to serve the project such as roads, curbs, walks, utilities, storm sewers, planting, etc.

NOTE: This Outline is based on the "Uniform System" for Construction Specifications, Data Filing, and Cost Accounting developed by AIA, CSI and AGC.

1. GENERAL REQUIREMENTS:

2. SITE WORK:

Type of Soil _____; Bearing Capacity _____
Material and thickness of fill and base course: _____

Demolition: Construction of structures to be demolished and materials to be reused.

Other land improvements. _____

Storm Drainage: Culverts, pipes, manholes, catch basins, downspout connection (dry well, splash blocks, storm sewer). _____

Site Preparation: Tree protection, surgery, wells, walls, topsoil stripping, clearing, grubbing, and rough grading. _____

Curbs and Gutters: Type and material. _____

Pavement: Material and thickness of base and wearing surface for drives, parking areas, streets, alleys, courts, walks, drying yards and play areas. Steps, handrails, checkwalls. _____

Equipment for Special Areas and Enclosures: Play equipment, benches, fences.

Finish Grading: Approximate existing depth and method of improving topsoil. Extent of finish grading.

Lawns and Planting: Type, size, quantity and location of lawn, ground cover and hedge material, trees, shrubs, etc.

3. CONCRETE:

Concrete strength for exterior walls below and above grade, interior walls and partitions, piers, footings, columns and girders. Size, thickness and location on drawings. Note portions having reinforcing steel on drawings. Location, size and material of footing drains and outlet.

Structural system of concrete floors at basement, other floors and roof. Thickness of slabs and strength of concrete. Attached exterior concrete steps and porches. If more than one type of construction is used, list separately and state locations.

Slab Perimeter Insulation

4. MASONRY:

Material and thickness of exterior walls above and below grade, interior walls and partitions, fire walls, stair, hall and elevator enclosures, chimneys, incinerators, veneer, sills, copings, etc.

5. METALS:

Miscellaneous Iron: Material and size of items such as:

Access Doors

Area Gratings

Lintels

Fire Stairs

Foundation Vents

Structural Steel: Framing or structural system used.

6. CARPENTRY:

Size, spacing and grade of lumber to be used for floor, roof, exterior walls above grade and interior partition framing, subfloor, sheathing, underlayment and exterior finish materials (wood siding, shingles, asbestos siding, etc.) _____

Grade and species for interior and exterior finish work. _____

7. MOISTURE PROTECTION:

Materials and method of waterproofing walls and slabs below grade, location, thickness or number of plies. Type of permanent protection of waterproofing (parging) if used. Method of dampproofing above grade. Flashing materials if other than sheet metal. Spandrel waterproofing. _____

Thermal Insulation: Thickness R-value and type of material.

Method of installation _____

Exterior Walls: _____ Roof: _____ Ceiling below roof: _____

Other: _____

Roofing: Roof covering materials and method of application, weight of shingles, number of felt plies, bitumen, etc. _____

Sheet Metal: Material and weight or gauge for flashings, copings, gutters and downspouts, roof ventilators, scuppers, etc. _____

Sealants: _____

8. DOORS, WINDOWS AND GLASS:

Windows and Frames: Type and Material. Special construction features or protective treatment. _____

Glazing: Thickness, strength and grade of glass and method of glazing. _____

Metal Curtain Walls: _____ Doors and Frames: _____

Exterior: Thickness, material and type at all locations. _____

Interior: Thickness, material and type for public halls and stairs, apartments (entrance and interior), boiler rooms, fire doors and other locations. _____

Finish Hardware:

Material and finish of exterior and interior locksets, sliding and folding door hardware, window and cabinet hardware, door closers, door knockers, numbers, etc. _____

Weatherstripping: Material and Type. _____

Windows _____

Exterior Doors _____ Thresholds _____

Screens: Type and material of mesh and frames. _____

9. FINISHES:

Grade, material, and thickness of all finishes. _____

Painting: Type and number of coats. _____

Exterior _____

Wood _____

Metal _____

Masonry _____

Interior _____

Walls & Ceilings _____

Bath _____

Trim & Millwork _____

Tile and Ceramic Bathroom Accessories: _____

Wall _____

Thickness, grade, finish and wainscot height. _____

Kitchen &

Floor and

Covering Materials:

LOCATION

FLOORS

WALLS

a. _____

b. _____

c. _____

Bathroom Accessories: Materials and Quantity. _____

Attached

Recessed _____

Resilient Flooring: Location, type and gauge, for all materials. _____

10. SPECIALTIES: List Significant Items. _____

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Schofield Barracks, Oahu, HI

Interior partitions other than concrete, masonry or wood. _____

Medicine Cabinets: Material, size and type. _____

Mailbox Systems. _____

Packaged Incinerators. _____

11.EQUIPMENT:

Refrigerators. Capacity for each size of living unit. _____

Kitchen Ranges: Size and type for each size of living unit. _____

Kitchen Cabinets: Material and Finish. Detail on drawings. _____

Wall Units: _____ Base Units: _____

Counter Top and Backsplash Material _____

Other cabinets and built-in storage units: _____

Garbage disposal units, dishwashers, clothes washers and dryers. _____

12.FURNISHINGS:

Blinds: Venetian blinds or other devices for privacy and control of natural light. _____

13.SPECIAL CONSTRUCTION: Incinerators - Job constructed.

14.CONVEYING SYSTEMS:

Elevators: Attach letter from manufacturer whose elevator installation is proposed, containing a brief comprehensive specification for the complete elevator installation, and the manufacturer's statement that the number of elevators proposed and the installation described will provide adequate service, and that manufacturer maintains an effective service organization in the project locality.

15.MECHANICAL:

Fixtures: Material, size, fittings, trim and color.

Sink _____ Shower over tub _____

_____ Lavatory _____

Stall Shower _____ Water Closet _____

_____ Bathtub _____

Tub Enclosure _____ Other _____

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Piping: Material and Fittings

Water _____
Soil Lines _____ Gas Lines _____
Waste Lines _____ Standpipes _____ Vents _____ Interior
Downspouts _____
Valve Shutoff for Servicing _____

Domestic Water Heating: Type, storage capacity, and recovery rate.

Direct fired: _____ Indirect fired: _____
(Separate boiler or combined with space heating boiler. _____)

Heating:

Kind of System: (Hot water, steam, forced air, etc.) _____ Fuel _____

Used: _____ Total Calculated Load: _____ Heating _____

_____ Domestic Hot Water _____ Equipment: (Make and

Model) _____ Input (per hour): Electricity _____

Oil _____ Gas _____ Output (kW or BTUH) _____

Space Heaters: Type, make, model, location and output of heating systems such as wall heaters, floor
furnaces and unit heaters. _____

Solar Energy:

Application: (Heating/Domestic Water Heating) _____

System _____ Subsystem _____ System Capacity _____

Insulation: Type and thickness of insulation on water lines and water heating equipment. _____

Distribution System:

Insulation: Type and thickness of insulation on heating equipment and distribution system. _____

Room Heating Units: Baseboard units, radiators, convectors, register, etc. _____

Temperatures Controls: Individual unit, zone, central, etc. _____

Ventilation: Location, capacity and purpose of ventilating fans. _____

Air Conditioning: Unitary Equipment, Self Contained or packaged units.

Calculated load: _____

Equipment: Make model, operating voltage and capacity for each size serving individual rooms, apartment
units, or zone. _____

Central System:

Calculated load: _____ Equipment: _____

Make, model, capacity, etc., of compressor, condenser, cooling tower, water chillers, air handling equipment,

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and other components which make up the complete system. _____

Utilities On-Site: Material for distribution system for all piped utilities.

Water Supply: Fire hydrants, yard hydrants, lawn sprinkler systems, exterior drinking fountains. _____

Gas: _____

Sanitary Sewerage: Treatment plants, pumping stations, manholes. _____

16.ELECTRICAL:

Electrical Wiring: Type of wiring and load centers, number of circuits per unit, individual unit metering or project metering, spare conduit for future load requirements, radio or TV antenna systems. Show receptacles, light outlets, switches, power outlets, telephone outlets, door bells, fire alarm systems, etc., on drawings. _____

Electric Fixtures: Type for various locations. _____

Electric light standards for lighting grounds, streets, courts, etc. Underground or overhead service.

All items of construction, equipment and finish, together with all incidentals, which are essential to the completion of the project will be provided whether or not specifically included in the exhibits and will be of a type, quality and capacity acceptable to HUD and appropriate to the character of the project.

(Signatures)

Local Authority of Developer

By _____
Architect

ATTACHMENT 3
FORMAT FOR REQUIRED CALCULATIONS

ATTACHMENT 3

FORMAT FOR REQUIRED CALCULATIONS

OFFEROR'S IDENTIFICATION NUMBER: _____ **UNIT TYPE:** _____

NOTE: Providing calculations in metric units is mandatory. The provision of calculations in inch-pound units is optional.

1. NET AREA CALCULATIONS: See TABLE 5-1 - SIZE OF FAMILY HOUSING UNITS BY PAY GRADE in the STATEMENT OF WORK.

- a. Gross Area: _____ m² _____ ft² (as defined by the AIA.)
- b. Exterior Wall Thickness: _____ mm _____ in
- c. Interior Area: _____ (area within inside finishes of exterior/party walls, excluding carport/garage)

Interior Area					
Length (mm)	Width (mm)	Area (m ²)	Length (ft-in)	Width (ft-in)	Area (ft ²)
TOTAL			TOTAL		

- d. Deductible Areas: (Dimensions to center line of enclosing interior partitions)

(1) Utility Room:

Utility Room Area					
Length (mm)	Width (mm)	Area (m ²)	Length (ft-in)	Width (ft-in)	Area (ft ²)

(2) Laundry Area: (if not in utility room)

Laundry Area					
Length (mm)	Width (mm)	Area (m ²)	Length (ft-in)	Width (ft-in)	Area (ft ²)

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(3) Interior Bulk Storage Rooms:

Interior Bulk Storage Area					
Length (mm)	Width (mm)	Area (m ²)	Length (ft-in)	Width (ft-in)	Area (ft ²)
TOTAL			TOTAL		

(4) Heater, Air Conditioner, Hot Water Heater, Ductwork, and Stacks: (if not included in above)

Heater, Air Conditioner, Hot Water Heater, Ductwork, and Stack Area					
Length (mm)	Width (mm)	Area (m ²)	Length (ft-in)	Width (ft-in)	Area (ft ²)

(5) Stairway and Intermediate Landings:

Stairway and Intermediate Landing Area					
Length (mm)	Width (mm)	Area (m ²)	Length (ft-in)	Width (ft-in)	Area (ft ²)

(6) Increases in Floor Area Required to Meet Accessibility Requirements:

Accessibility Increases Area					
Length (mm)	Width (mm)	Area (m ²)	Length (ft-in)	Width (ft-in)	Area (ft ²)

(7) Unfinished Attic:

Unfinished Attic					
Length (mm)	Width (mm)	Area (m ²)	Length (ft-in)	Width (ft-in)	Area (ft ²)
TOTAL			TOTAL		

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(8) Total Deductible Area:

Total Deductible Area			
Area No.	Area Name	Area (m ²)	Area (ft ²)
1	Utility Room		
2	Laundry Area		
3	Interior Bulk Storage		
4	Heating, Hot Water, A/C, Ductwork & Stacks		
5	Stairways & Landings		
6	Accessibility Increases		
7	Unfinished Attics		
TOTAL			

e. Net Area: (Subtract sum of d. from c.)

Net Area			
d.	- c.	Area (m ²)	Area (ft ²)
Minimum Net Allowable Area			
Basic Net Area			
Maximum Allowable Net Area			

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2. FORM

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AT FOR KITCHEN CABINET SIZE: See TABLE 5-5 - KITCHEN CABINET, COUNTER, & PANTRY AREA
in the STATEMENT OF WORK.

Kitchen Cabinet Area				
Area	Required		Provided	
Element	m ²	ft ²	m ²	ft ²
Wall Cabinet				
Base Cabinet				
Drawer Area				
Counter Area Note ¹				
Percentage of Required Area				

Note ¹: Exclusive of area occupied by sink and range.

3. FORMAT FOR BEDROOM SIZES: See TABLE 5-3 - MINIMUM AREAS AND DIMENSIONS - INTERIOR SPACES in the STATEMENT OF WORK.

Bedroom Area and Dimensions					
Required Minimum Area and Dimensions					
Bedroom Number	N/A	#2	#3	#4	
Dimension mm [ft-in]			30 00 [10 '- 0"]	23 00 [9'- 6"]	
Area m ² [ft ²]			9.0 [10 0]	8.4 [90]	
Provided Minimum Area and Dimensions					
3 Bedroom Unit				N/A	
4 Bedroom Unit					
5 Bedroom Unit					
Percentage of Required Area					

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4. FORMAT FOR CLOSET SIZES: See TABLE 5-6 - MINIMUM CLOSET WIDTHS in the STATEMENT OF WORK.

Closet Widths					
Closet Location	Minimum Requirement		Actual Provided		Percentage of Minimum Requirement
	mm	ft	mm	ft	
Coat/Entry Hall					
Master/Bedroom #1					
Bedroom #2					
Bedroom #3					
Bedroom #4					
Bedroom #5					
Broom					
Linen					
Other					

5. FORMAT FOR BULK STORAGE: See TABLE 5-7 - MINIMUM INTERIOR, EXTERIOR, & COMBINED BULK STORAGE in the STATEMENT OF WORK.

Bulk Storage Area					
Type	Minimum Requirement		Actual Provided		Percentage of Minimum Requirement
	m ²	ft ²	m ²	ft ²	
Interior					
Exterior					
TOTAL					

6. FORMAT FOR PATIO AND BALCONY SIZES: See TABLE 5-4 - MINIMUM AREAS AND DIMENSIONS - EXTERIOR SPACES in the STATEMENT OF WORK.

Patio - Minimum Areas and Dimensions								
Spaces	Minimum Requirement				Provided			
	Area		Dimension		Area		Dimension	
	m ²	ft ²	mm	ft-in	m ²	ft ²	mm	ft-in
Patio - 3 BR	13.6	144	3000	10-0				
Patio - 4 BR	17.0	180	3000	10-0				

ATTACHMENT 4
PROPOSAL DRAWING FORMAT

ATTACHMENT 4
PROPOSAL DRAWING FORMAT

1. POLICY.

Drawings shall be prepared in accordance with Section 00100, REQUIRED TECHNICAL DATA FOR PROPOSAL SUBMISSION, and the following instructions on graphic format.

2. COMPUTER AIDED DESIGN AND DRAFTING (CADD): CADD may be used for the proposal submission. The final after award submission to the Government shall be in Bentley Microstation. If the winning proposer elects to use AUTO CADD in preparing the working drawings, special attention (i.e. don't use X-ref) is necessary in the preparation of the AUTO CADD files to insure a clean conversion into MICROSTATION.

a. The drawings shall show sufficient detail so that they clearly delineate the proposed construction. Original drawings for proposal submission shall be prepared on standard size sheets (762 mm [30 inches] by 1067 mm [42 inches] using the proposer's own format and style). Original drawings for after award submissions shall be made on standard size sheets (762 mm [30 inches] by 1067 mm [42 inches] with standard zoning size of 711 mm [28 inches] by 1016 mm [40 inches], see FIGURE 1). Proposal submission shall be provided with dual measurements (metric and inch-pound), utilizing hard metric or soft metric measurements as described in Attachment 16 Metric Measurements. Drawings for after award submissions by the winning proposal may be done either in metric or inch-pound units. Drawings may be done in pencil or ink, but not a combination thereof on the same drawing. The proposal submittal of drawings shall be made on standard half-size sheets and one full-size reproducible set as required by Section 00100.

b. Cover Sheet: The first or cover sheet shall contain the title and location of the project and the Drawing Index (Schedule of Drawings).

c. DRAWING LAYOUT: The drawing layout will be evaluated with care before the beginning of the drafting. Ample space, without crowding, will be provided, not only for the required plans and details with all necessary titles, dimensions and notes, but also for incidental information required such as graphic scales, general and reference notes, schedules, North Arrow, etc.

d. Scale: Proposal sheets shall be well ordered and drawn at the scales specified utilizing hard metric or soft metric or English measurements. Any drawings not specifically listed shall be drawn at a reasonable scale and suitable for reduction. Similar work for all design disciplines shall, whenever possible, be shown at the same scale on the various dwgs involved. Cluttered and overcrowded layouts shall be avoided.

e. Graphic Scale: A graphic scale for each of the different scales used on a drawing shall be placed on the particular drawing to the left of the title block. Scale shall be indicated at each plan, elevation, section, and detail, unless all drawings on the same are at the same scale. No scale larger than 1:2 shall be used without prior approval.

f. Detail Format: Sheets devoted to detail should have such details reasonably spaced and arranged left to right or top to bottom. Groups of details relating to one particular aspect should be adequately separated from other

groups and identified with a title. Sections and details of the final design should be numerous enough to show all design features.

g. Clarity of Details: Unnecessary details or details of small standard products or items which are adequately covered by specifications and/or catalogs shall not be included on the drawings.

3. DRAWING PREPARATION.

a. Preparation for size reduction. Since drawings will be reduced, all drafting (line widths, spacing, lettering sizes, etc.) shall be adequate size and density to be easily legible after reduction (FIGURE 2).

b. Scales. Carefully plan drawing layout together, with suitable scales in advance to properly delineate the project. Similar work for all design disciplines shall, whenever possible, be shown at the same scale on the various drawings involved.

c. Lettering. Use single stroke lettering, all capitals. Minimum height shall be 4 mm (5/32 inch).

d. Sheet reference. The proposer will reference all drawings within a discipline of work. The divisions designated below will be utilized.

Discipline Designation	Design Discipline
T	Title, Location Map, & General Notes
L	Site Planning, Landscaping Planting and Childrens Outdoor Play Areas
C	Civil Engineering
A	Architecture
S	Structural Engineering
M	Mechanical Engineering
E	Electrical Engineering
G	Geotechnical Engineering

e. Each drawing in the particular division shall be designated by the discipline designation and sheet number (i.e., E-6 is the sixth Electrical drawing.) This system as listed will be used in establishing sequence of drawings. The notation system shall be placed in the last increment of the drawing number block entitled "sheet".

- f. Ring number. Consecutive ring numbering shall begin with the cover sheet. Ring number shall be placed in circle directly below "Sheet" block of Title Block (FIGURE 1). Sheets inserted after ring numbers have been finalized shall be designated with the ring number of the original sheet preceding it and an alpha from A to Z beginning with A (i.e., ring 32A follows ring 32).
- g. Cross reference. Cross-referencing for sections and details shall be based on the sheet reference number (FIGURE 4). Adequate cross-referencing must be shown to avoid confusion and misunderstanding between disciplines.
- h. Symbols and conventions. Symbols and conventions serve two main purposes. One is to simplify the drawing and improve comprehension; the other is to follow or establish a standard which is easily recognized. Symbols shall be the standards used by the various disciplines.
- i. Legends. Place legends of symbols and material indications on the drawings. Since many symbols are limited to certain design disciplines, use separate symbol legends on the initial sheet of each design discipline. Symbols in the legend shall be at the same scale or slightly larger than used on the drawings.

ATTACHMENT 5
PROJECT AND HOUSING SIGNS

ATTACHMENT 5

PROJECT AND HOUSING SIGNS

THE COMPLETION AND INSTALLATION OF
BUILDING AND CUL-DE-SAC SIGNS SITUATED
AT FAMILY HOUSING AREAS

1. STATEMENT OF WORK. Except as otherwise provided in the contract, the Contractor shall furnish all labor, equipment and other services to perform all work shown in strict accordance with these specifications and accompanying drawings.

2. ITEMS OF WORK.

- a. Sign on Buildings: All materials shall be Contractor furnished.
- b. Apply 3M Scotchlite reflective sheeting, brown, onto aluminum sign blanks for buildings. Trim off excess (edges) (FIGURE 4A).
- c. Contractor shall use signmaker machine, die-cast all required building numbers and apply onto all sign faces. Numbers shall be of reflective engineer grade-white.
- d. Install signs, 2 each, on buildings so as to have a clear view from or to oncoming traffic.
- e. Signs For Cul-de-sac: Cul-de-sac signs are reference signs placed at the entry to cul-de-sacs which lists the numbers of all building located on the cul-de-sac (FIGURE 4B). All materials shall be Contractor furnished.
- f. Contractor shall furnished sign blanks with applied Scotchlite reflective sheeting.
- g. Contractor shall use signmaker machine, die-cast all required building number and apply onto all sign faces. Number shall be of reflective engineer grade-white.
- h. Install all cul-de-sac signs at locations so as to have a clear view from or to oncoming traffic. These signs are installed in concrete footings and plumbed straight.

3. TONING. Prior to all cul-de-sac sign installation, all sites for footings shall be toned for possible damage to underground utilities (electrical, water, telephone or gas lines).

4. WORK COORDINATION. Installation of all buildings and cul-de-sac signs shall be coordinated with Family Housing Representative, ph no. (808) 655-0177, Building 690, Schofield Barracks.

PROJECT SIGN DRAWINGS:

- 1. Contractor shall provide a Project Sign as shown on Dwg Nos. 40-21-01/06. Project Sign shall be located at key location on the site for public view.

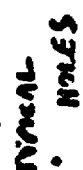


FIGURE 5A

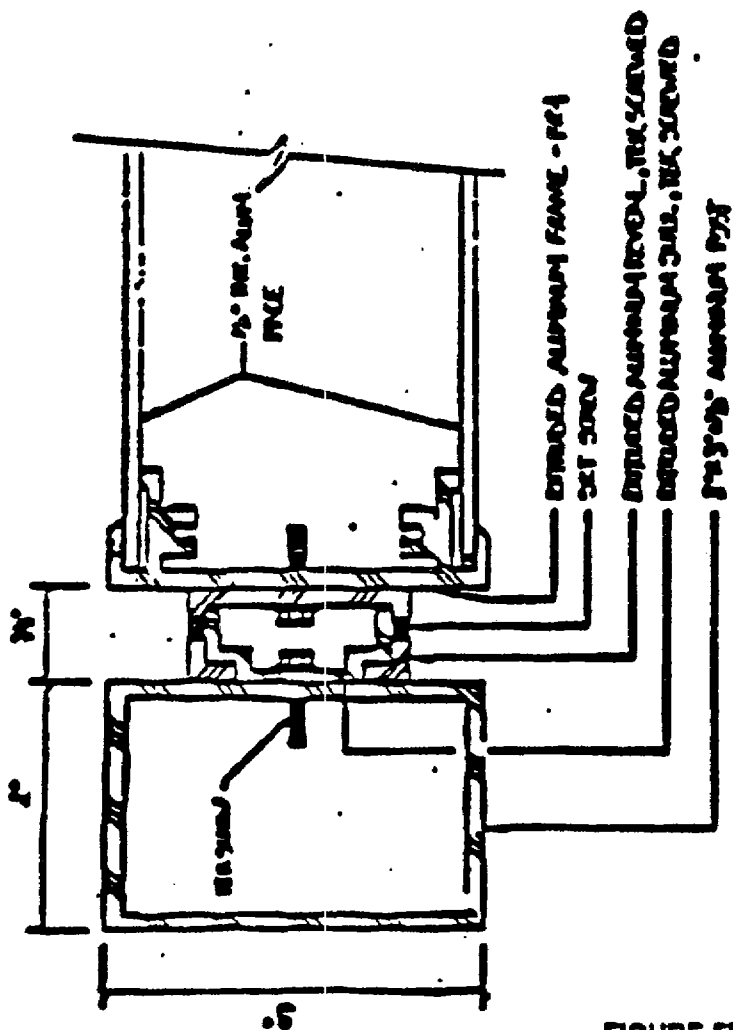


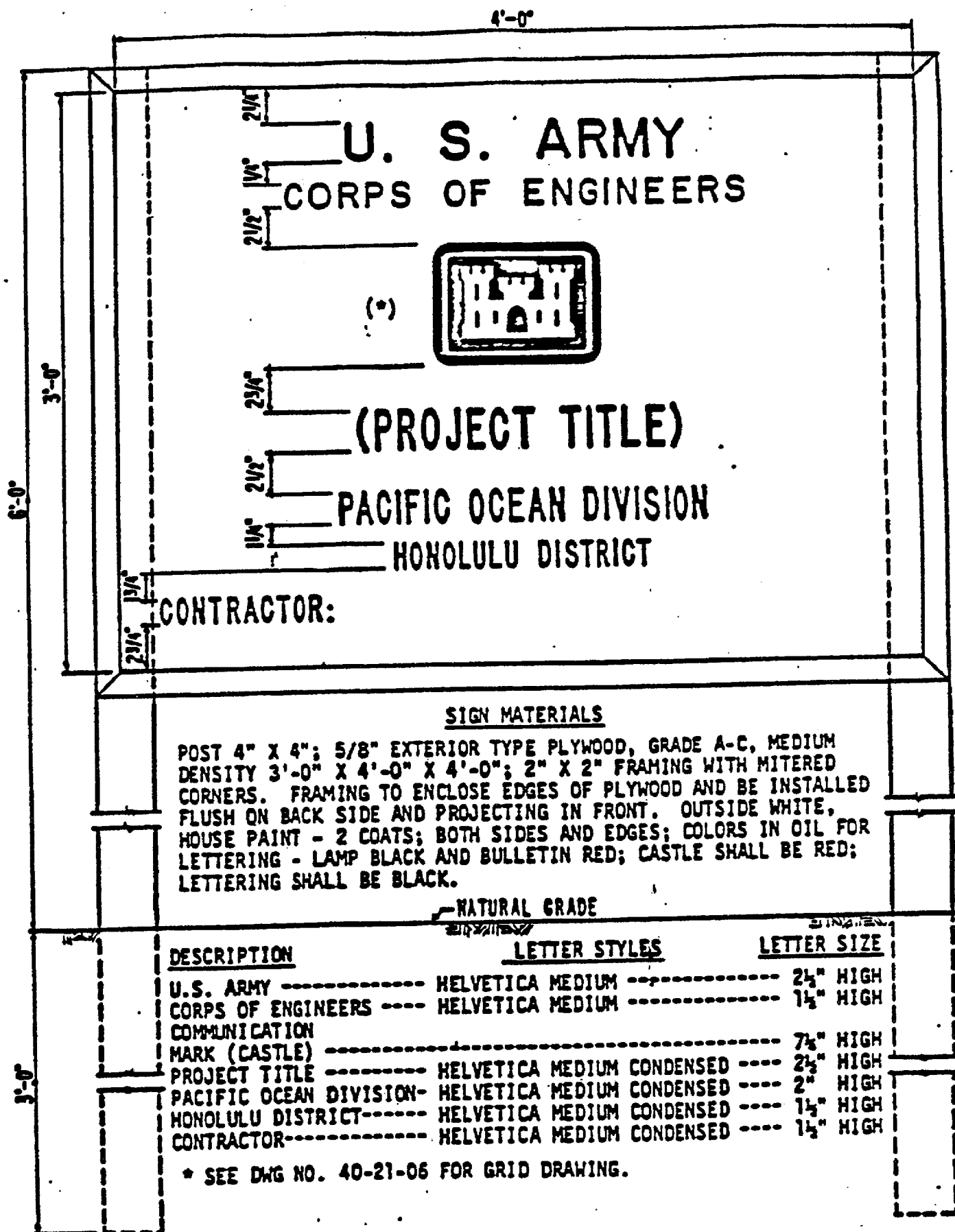
FIGURE 5B

NOT TO SCALE

LOCATION
 CONSTRUCTION
 DOUBLE PLY PANEL, TYPE C-2
 ASSEMBLY, NON-ILLUMINATED.
 PANELS HAVE NO GRAPHS.
 COLOR
 PLY 1 PANEL - BROWN
 (W/RE DETACHED)
 POINT
 POINT BURNAL IN CEMENT
 (P/ST LAMIN AND GRAPHS TO BE
 DETACHED)

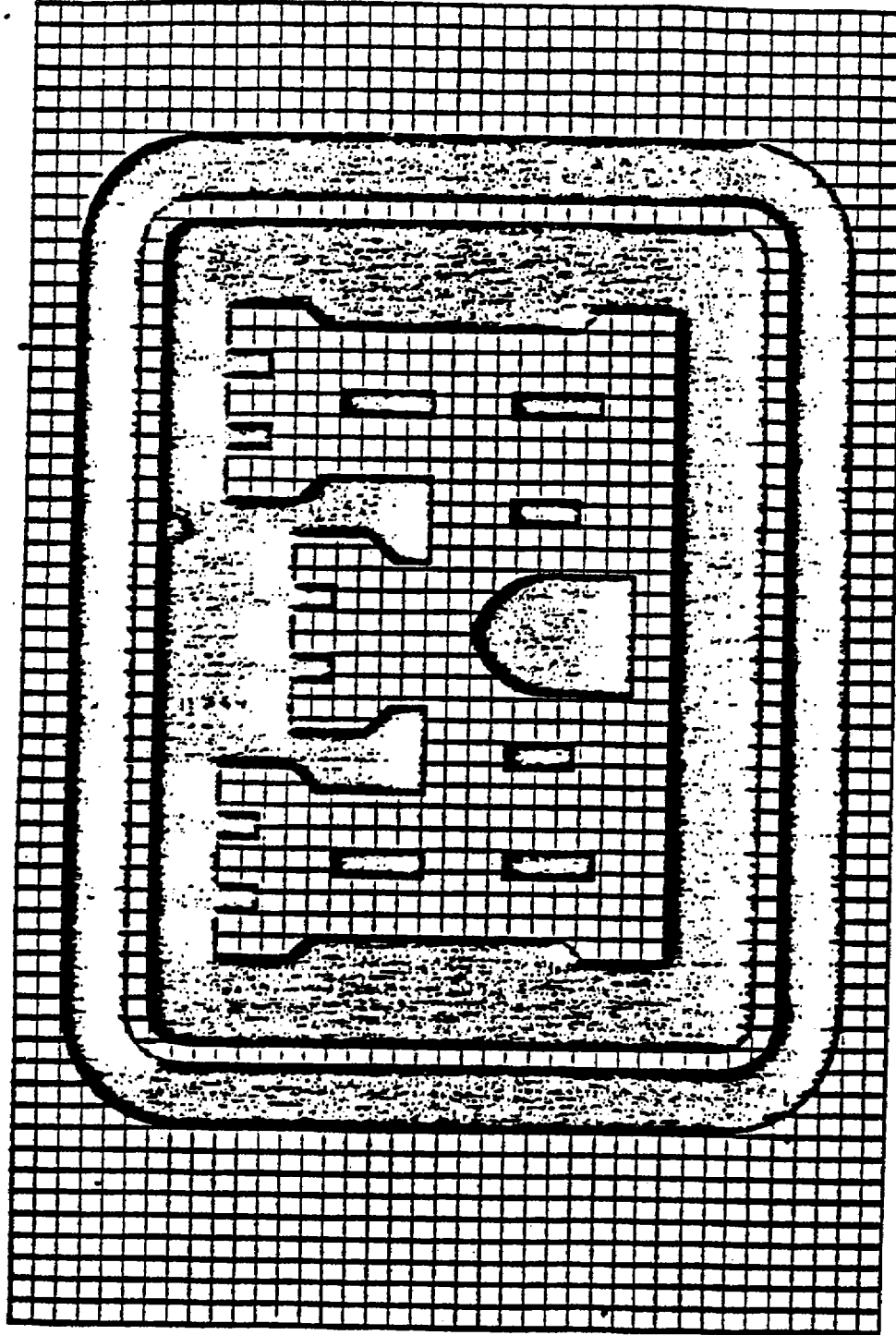
Construction
 Assembled Products
 PLY 1 PANEL - BROWN
 PLY 2 PANEL - BROWN
 PLY 3 PANEL - BROWN

ERM 43-87



PROJECT SIGN

DWG. NO. 40-21-01



NOTE: The proportions shown are to be followed exactly when manually reproducing the mark at extremely large sizes. Background - Red; Castle - White.

GRID DRAWING OF COMMUNICATION MARK

DWG. NO. 40-21-06

ATTACHMENT 6

PRELIMINARY SOILS INVESTIGATION REPORT

**Preliminary
Soils Investigation Report**

**FY98 FHNC PN 39037 REPLACE FAMILY HOUSING
Area "U", Schofield Barracks, Oahu, Hawaii
February 1997**

1.0 PURPOSE AND SCOPE. The purpose of this Preliminary Soils Investigation Report is to characterize the subsurface materials and provide preliminary recommendations for the area grading, foundation systems and vehicular pavements for the FY98 FHNC PN 39037 Replace Family Housing, Area "U", Schofield Barracks, Oahu, Hawaii. This project will be administered under a "Turnkey" (design and construct) Contract. As such, no concept designs for the site development or structures are available for use in the preparation of this report. After award of the contract, the Contractor shall retain a qualified geotechnical engineer to further evaluate the subsurface conditions by additional sampling, testing, and analyses, as required, commensurate with the nature of the project. The Contractor's geotechnical engineer shall prepare a Final Soils Investigation Report to document all additional drilling, sampling and testing; selection of soil parameters for design; and the final design of foundations and pavements.

2.0 GEOLOGIC DATA. Schofield Barracks is located on the Schofield Plateau between the Waianae and Koolau Ranges. The project area is generally underlain by thick deposits (approximately 50 feet) of residual soils from the decomposition of the basalt bedrock. The residual soils are in various stages of physical and chemical weathering. The weathering decreases with depth downward from the surface. Near surface soils are completely altered to fully pulverized deposits having no characteristics of the original rock.

3.0 PROJECT DESCRIPTION.

3.1 Facility Description. The proposed family housing project involves the construction of approximately 132 replacement dwelling units, related streets, utilities, communications, and appurtenances at Area "U", Schofield Barracks, Oahu, Hawaii. It is anticipated that the dwelling units will be configured in various multi-unit or townhouse buildings (1-story or 2-story, as required). Each unit will be provided with one covered and one uncovered parking stall. The project will include utility services, paving, walks, site improvements, information systems and landscaping.

3.2 Site Description. Area "U" is located in the southwest quadrant of Schofield Barracks and bounded by Trimble Road on the north, Hewitt Street on the east, Kolekole Avenue on the south and Solomon Elementary school on the west. See Vicinity Map at Plate 1.

4.0 SUBSURFACE INVESTIGATIONS.

4.1 Drilling Program. Subsurface drilling work at Area "U" was completed under the FY94 Replace Junior NCO Quarters project in June 1992. Eight borings (B1 to B8) were to a maximum depth of 20 feet, using a CME-55 drill rig. The holes were advanced using continuous flight augers and logged using the Unified Soils Classification System. The boring locations are shown on Plate 2 and the boring logs are shown in Appendix A.

4.2 Soil Sampling and Laboratory Testing. Disturbed soil samples were obtained using a standard split barrel sampler (ASTM D 1586). The number of blows per foot of standard penetration (N-value) is superimposed on the boring logs where appropriate. Atterberg limits, mechanical analysis with hydrometer, specific gravity, Gibbs and Holtz free swell and moisture content determinations were performed on representative samples to confirm the visual classifications. Selected laboratory test data are shown on the individual boring logs. Additional laboratory test data are shown in Appendix B.

5.0 SUBSURFACE CONDITIONS. The borings indicate that the site is underlain by reddish-brown to brown clayey silts (MH) with zones of silty clay (CH-MH). These residual soils range in consistency from stiff to hard. The Atterberg limits indicate the near surface soils have a low to medium expansion potential. No basalt bedrock was encountered; however, prior experience indicates occasional boulders will be encountered through out the soil profile. No ground water was encountered to the maximum depth drilled.

6.0 FOUNDATION DESIGN.

6.1 Reference. Army Technical Manual TM 5-818-1, "Soils and Geology: Procedures for Foundation Design of Buildings and Other Structures," October 1983.

6.2 Discussion. The upper soils are an adequate bearing stratum with some recompaction. Any loose zones or areas disturbed during demolition shall be compacted during the earthwork operations. Conventional spread footings (isolated and continuous) and thickened slab foundations should be adequate. Based on the subsurface conditions, excavations can be accomplished using conventional earth moving equipment. No bedrock is expected, but occasional boulders will be encountered.

6.3 Recommended Allowable Soil Bearing Pressure. Based on the N-values of the surface soils, the allowable bearing pressures for footings bearing on undisturbed clayey silt shall be 3,000 psf. For footings bearing on properly compacted fill, the allowable bearing pressure shall be 2,500 psf. All footings shall bear a minimum 18 inches below finish grade.

6.4 General Grading Recommendations.

6.4.1 The ground surface where construction is proposed shall be completely cleared, stripped and grubbed to a depth sufficient to remove all pavements, slabs, appurtenances, vegetation, roots, and other debris. Surfaces to receive fill shall be properly scarified, moisture conditioned to within 3% of optimum moisture and compacted to the specified density.

6.4.2 Pockets of loose fill or insitu materials and areas disturbed during clearing, grubbing or demolition operations shall be scarified down to firm bearing, moisture conditioned to within 3% of optimum moisture and compacted to the specified density.

6.4.3 All excavated material free of deleterious matter and stones larger than 3 inches, may be used as satisfactory fill material. **Imported** satisfactory fill material shall consist of materials classified by ASTM D 2487 as GW, GP, GM, GC, SW, SP, SM, SC, ML, MH, and CL. In addition, any imported material shall have a liquid limit less than 60 and a plasticity index less than 30.

6.4.4 Structural fills (e.g., under building slabs or paved areas) shall be moisture conditioned to within 3% of optimum moisture and compacted to a minimum 95% of maximum density for cohesionless soils, and a minimum 90% of maximum density for cohesive soils, as determined by ASTM D 1557. Non-structural fills (e.g., under sidewalks and grassed areas) shall be properly moisture conditioned, and compacted to a minimum 90% of maximum density for cohesionless soils, and a minimum 85% of maximum density for cohesive soils.

6.4.5 Place all fill and backfill in 8 inch maximum loose lifts and compact utilizing heavy compaction equipment. Where power driven, hand-tampers (e.g., "jumping jacks") are used, place fill and backfill in 6 inch maximum loose lifts.

6.4.6 The finished grade within 10 feet of the building perimeter should be sloped at a 5% grade away from the building to ensure positive drainage.

7.0 FLEXIBLE PAVEMENT DESIGN.

7.1 References.

7.1.1 Army Technical Manual TM 5-822-2, "General Provisions for Roads, Streets, Walks and Open Storage Areas," July 1987.

7.1.2 Army Technical Manual TM 5-822-5, "Pavement Design for Roads, Streets, Walks, and Open Storage Areas," June 1992.

7.2 Residential Streets and Parking Areas Within the Housing Area.

7.2.1 Discussion. The amount of new pavements is dependent on the layout of the new dwelling units. Roads within the housing areas (residential roads) are considered as secondary roads and designed using a design traffic consisting of POVs, pickup and panel trucks (Group 1), and occasional 2- and 3-axle delivery and service trucks (Group 2 and 3).

7.2.2 Design Parameters/Required Thickness.

Traffic Category:	III
Class Street:	E
Design Index:	3
Subgrade CBR:	12%
Base Course CBR:	80%
Design Total Thickness	7.3 inches

Recommended Pavement Structure:

Surface Course AC:	2 inches
Base Course:	6 inches

7.3 Kolekole Avenue Widening.

7.3.1 Discussion. Kolekole Avenue is considered to be a primary road and will be designed for traffic comprised of more than 25% trucks (Category IVA). The traffic and soil parameters used in the design are consistent with those being used for widening of Kolekole Avenue under the FY97 MCA PN 42470 Whole Barracks Renewal Project, Schofield Barracks, Oahu, Hawaii.

7.3.2 Design Parameters/Required Thickness.

Traffic Category:	IVA
Class Street:	C
Design Index:	6
Subgrade CBR:	10%
Base Course CBR:	80%
Design Total Thickness	12.5 inches

Recommended Pavement Structure:

Surface Course AC:	3 inches
Base Course:	5 inches
Subbase Course:	5 inches

7.4 Flexible Pavement General Recommendations.

7.4.1 The pavement designs presented herein reflect the minimum pavement sections that should be considered for this project. The pavement designs will be verified by the contractor. Should the design traffic and/or subgrade CBR value vary significantly from those assumed in the pavement design, then the flexible pavement design shall be revised in the contractor's Final Soils Investigation Report. However, in no case shall the pavement sections be less (thinner) than reflected in the pavement designs presented herein.

7.4.2 The asphalt concrete shall meet Hawaii Standard Specifications for Road and Bridge Construction, Mix No. IV (revised 1990), Asphalt Viscosity Grade modified AR8000, with a minimum penetration of 25. The asphalt pavement shall be compacted to a minimum 91% of theoretical maximum density as determined by ASTM D 2041.

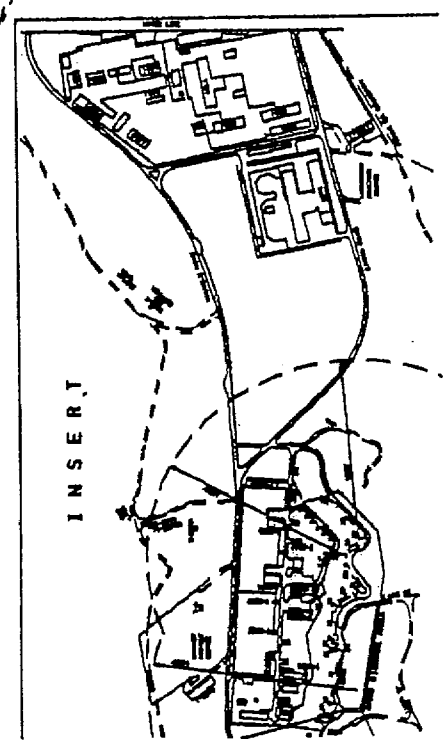
7.4.3 The base course shall meet Hawaii Standard Specifications for Road and Bridge Construction, 1-1/2 inch maximum size aggregate gradation. The base course shall be compacted to 100% of maximum density. Maximum density shall be determined in accordance with ASTM D 1557, Method C, for material that has no more than 30 retained on the 3/4" sieve and has more than 20 percent retained on the 3/8" sieve. For materials that do not meet the above gradation requirement, maximum density shall be determined in accordance with AASHTO T 180, Method D.

7.4.4 The prime coat shall meet ASTM D 2027 for MC-30 or MC-70 (cutback asphalt), and shall be applied at a rate of 0.15 to 0.40 gallons per square yard. Prime coat shall be placed on top of the compacted base course prior to placement of the surface course.

7.4.5 The tack coat shall meet ASTM D 977 for SS-1 (emulsified asphalt), and shall be applied at a rate of 0.05 to 0.20 gallons per square yard. Tack coat shall be used to bond new asphalt pavement to any existing asphalt pavement or concrete structures (e.g., curb and gutters).



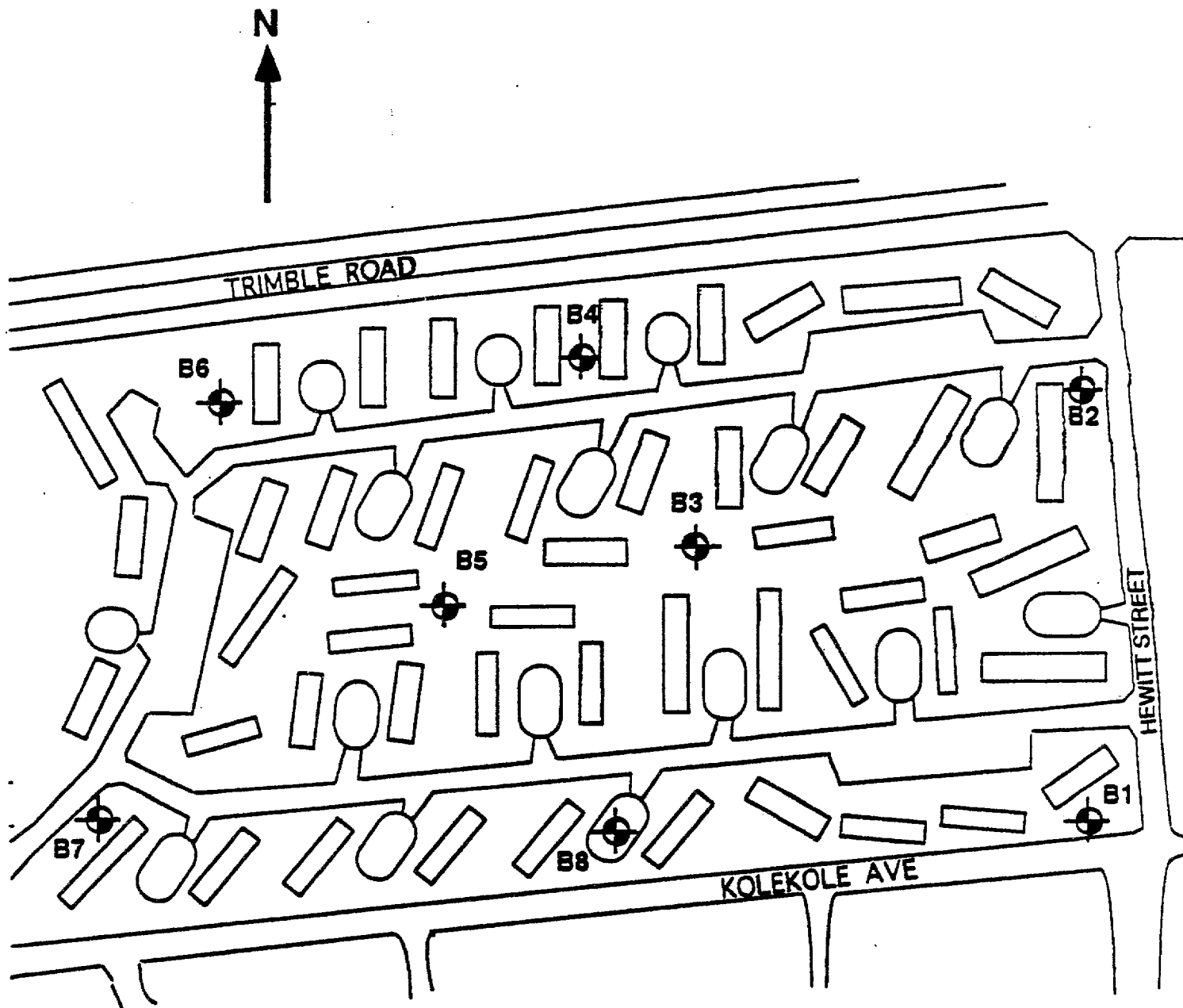
SCHOFIELD BARRACKS



INSERT

PROJECT LOCATION

FY98 FHNC PN 39037
 REPLACE FAMILY HOUSING
 AREA "U"
 VICINITY MAP
 SCHOFIELD BARRACKS, OAHU
 PLATE 1



FY98 FHNC PN 39037
REPLACE FAMILY HOUSING
AREA "U"
BORING LOCATION PLAN
SCHOFIELD BARRACKS, OAHU

PLATE 2

APPENDIX A
BORING LOGS AND LEGEND

Project Number: LEGEND
 Boring Number: DOC

PLATE A1

Project Name: JR MCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Depth to Water (ft): NOT ENCOUNTERED
 Drill Company: GEOSERVICES HAWAII
 Drill Rig: CME 55
 Inspector: ERIC BJORKEN
 Casing Depth (ft): NA
 Core Recovery (%): NA

Project Number: SC0392
 Boring Number: 81
 Project Name: JR MCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Top of Hole (elev): 932.6' MSL
 North: 118,632
 East: 476,117
 Completion Date: 25 JUN 92

PHI (degrees)	C (TSF)	GRAV (%)	SAND (%)	FINE (%)	Gs	LL (%)	PI (%)	Wn (%)	N or > CR <	F e t	Visual Classification
								29	23	1	[NH] 0.0-20.0' SILT, CLAYEY, VERY PLASTIC, VERY STIFF TO HARD, DAMP TO MOIST, REDDISH BROWN TO BROWN
						55	25	29	18	2	
								33	35	3	
								33	62	4	
								32	59	5	
										6	
										7	
										8	
										9	
										10	
								37	49	11	
										12	
										13	
										14	
										15	
										16	
										17	
								33	42	18	
										19	
										20	

Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Depth to Water (ft): NOT ENCOUNTERED
 Drill Company: GEOSERVICES HAWAII
 Drill Rig: CME 55
 Inspector: ERIC BJORKEN
 Casing Depth (ft): NA
 Core Recovery (%): NA

Project Number: SC0392
 Boring Number: 82
 Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Top of Hole (elevation): 931.0' MSL
 North: 119,216
 East: 476,096
 Completion Date: 25 JUN 92

PHI degrees	C (TSF)	GRAV (%)	SAND (%)	FINE (%)	G _s	LL (%)	PI (%)	W _n (%)	N or > CR <	F e t	Visual Classification
								25	31	1	[CMH] 0.0-5.7' SILT, CLAYEY, SOME CONSTRUCTION DEBRIS, DAMP TO MOIST, VERY STIFF TO STIFF, REDDISH BROWN (FILL)
								25	16	2	
										3	
								27	9	4	
										5	
						88	51	32	28	6	5.7-20.0' SILT, CLAYEY, VERY PLASTIC, ZONES OF CLAY, DAMP TO MOIST, VERY STIFF, REDDISH BROWN
								32	79	7	
										8	
										9	
										10	
										11	
										12	
										13	
								37	25	14	
										15	
										16	
										17	
										18	
								38	22	19	
										20	

Project Name: JR NCO QUARTER
 Project Location: SCHOFIELD BARRACKS
 Depth to Water (ft): NOT ENCOUNTERED
 Drill Company: GEOSERVICES HAWAII
 Drill Rig: CME 55
 Inspector: ERIC BJORKEN
 Casing Depth (ft): NA
 Core Recovery (%): NA

Project Number: SC0392
 Boring Number: B3
 Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Top of Hole (elev): 936.4' MSL
 North: 119,005
 East: 475,568
 Completion Date: 25 JUN 92

PHI degrees	C (TSF)	GRAV (%)	SAND (%)	FINE (%)	Gs	LL (%)	PI (%)	Wn (%)	N > CR <	F e t	Visual Classification
						56	25	23	33	1	(MH) 0.0-20.0' SILT, CLAYEY, VERY PLASTIC, DAMP TO MOIST, VERY STIFF TO HARD, REDDISH BROWN
								26	60	2	
								31	39	3	
										4	
										5	
								31	72	6	
								33	59	7	
										8	
										9	
										10	
										11	(TRACE GRAY CLAY MOTTLES)
										12	
										13	
								30	92	14	
										15	
										16	
										17	
								37	29	18	
										19	
										20	

Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Depth to Water (ft): NOT ENCOUNTERED
 Drill Company: GEOSERVICES HAWAII
 Drill Rig: CME 55
 Inspector: ERIC BJORKEN
 Casing Depth (ft): NA
 Core Recovery (%): NA

Project Number: SC0392
 Boring Number: B4
 Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Top of Hole (elev): 941.2' MSL
 North: 119,250
 East: 475,400
 Completion Date: 26 JUN 92

PHI degrees	C (TSF)	GRAV (%)	SAND (%)	FINE (%)	Gs	LL (%)	PI (%)	Wn (%)	N or > CR <	F e e t	Visual Classification
								23	21	1	[CMH] 0.0-20.0' SILT, CLAYEY, JAMP TO MOIST, VERY STIFF TO HARD, REDDISH BROWN TO BROWN
								27	43	2	
								33	50	3	
								33	70	4	
								33	48	5	
										6	
										7	
										8	
										9	
										10	
										11	
										12	
										13	
								30	33	14	
										15	
										16	
										17	
								44	17	18	
										19	
										20	

Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Depth to Water (ft): NOT ENCOUNTERED
 Drill Company: GEOSERVICES HAWAII
 Drill Rig: CME 55
 Inspector: ERIC BJORKEN
 Casing Depth (ft): NA
 Core Recovery (%): NA

Project Number: SC0392
 Boring Number: B5
 Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Top of Hole (elev): 940.5' MSL
 North: 118,121
 East: 475,207
 Completion Date: 26 JUN 92

PHI degrees	C (TSF)	GRAV (%)	SAND (%)	FINE (%)	Gs	LL (%)	PI (%)	Wn (%)	N or > CR <	F e s t	Visual Classification
								24	32	1	CNH1 0.0-20.0' SILT, CLAYEY, VERY PLASTIC, DAMP TO MOIST, VERY STIFF TO HARD, REDDISH BROWN TO BROWN
								28	49	2	
										3	
										4	
						66	35	33	55	5	
										6	
								35	45	7	
								32	63	8	
										9	
										10	
										11	(TRACE GRAY CLAY MOTTLES)
										12	
										13	
										14	
								36	60	15	
										16	
										17	
										18	
								34	39	19	
										20	

Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Depth to Water (ft): NOT ENCOUNTERED
 Drill Company: GEOSERVICES HAWAII
 Drill Rig: CME 55
 Inspector: ERIC BJORKEN
 Casing Depth (ft): NA
 Core Recovery (%): NA

Project Number: SC0392
 Boring Number: 86
 Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Top of Hole (elev): 949.5' MSL
 North: 119.188
 East: 474.899
 Completion Date: 26 JUN 92

PHI degrees	C (TSF)	GRAV (%)	SAND (%)	FINE (%)	Gs	LL (%)	PI (%)	Wn (%)	N or > CR <	F e e t	Visual Classification
						54	24	26	21	1	[MH] 0.0-20.0' SILT, CLAYEY, VERY PLASTIC, DAMP TO MOIST. VERY STIFF TO HARD, REDDISH BROWN TO BROWN
								30	27	2	
								32	23	3	
										4	
								29	73	5	
								33	55	6	
										7	
										8	
										9	
										10	
										11	
										12	
										13	
								22	17	14	
										15	
										16	
								47	12	17	
										18	
										19	
										20	

Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Depth to Water (ft): NOT ENCOUNTERED
 Drill Company: GEOSERVICES HAWAII
 Drill Rig: CME 55
 Inspector: ERIC BJORKEN
 Casing Depth (ft): NA
 Core Recovery (%): NA

Project Number: SC0392
 Boring Number: B7
 Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Top of Hole (elev): 946.0' MSL
 North: 118.624
 East: 474.716
 Completion Date: 26 JUN 92

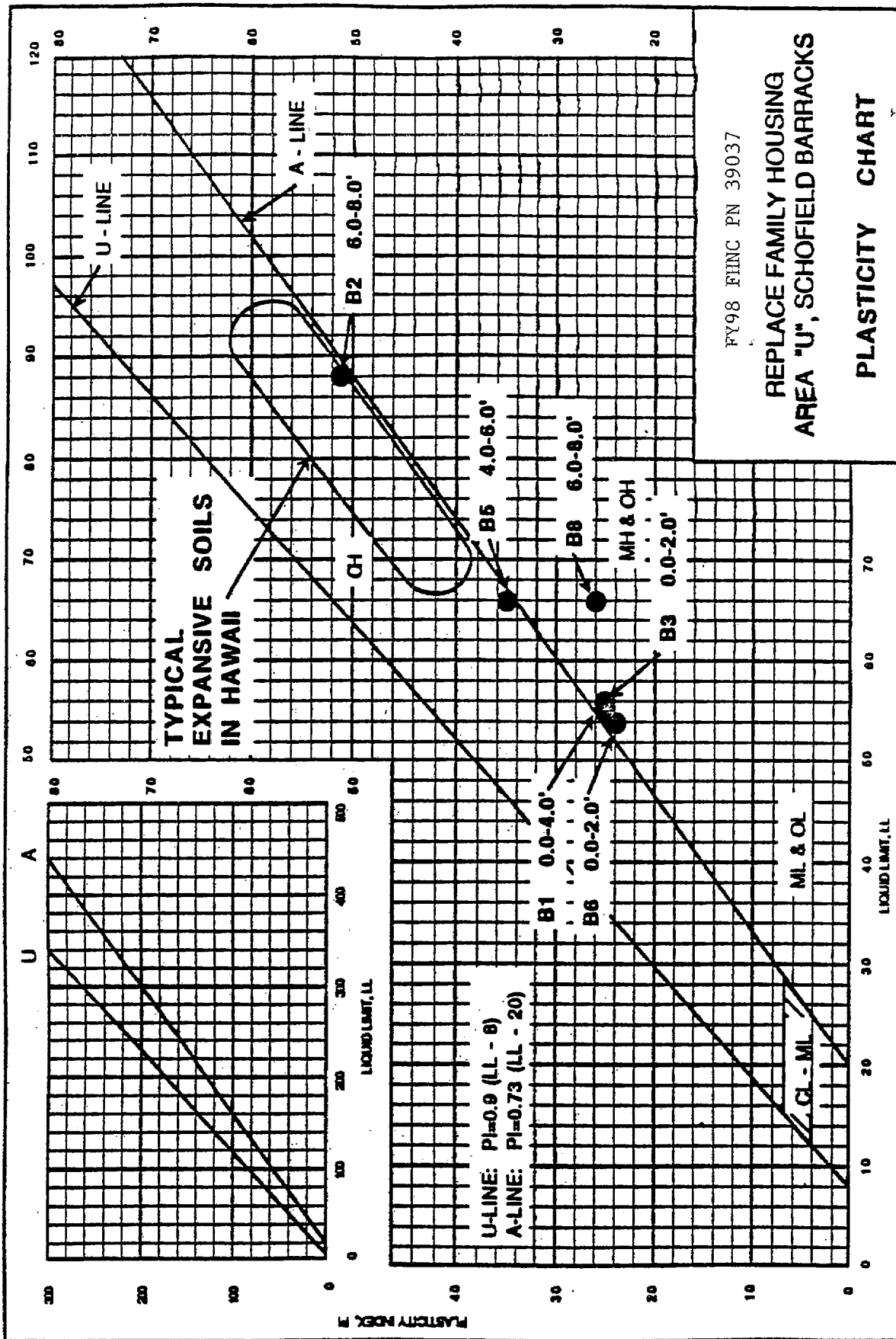
PHI degrees	C (TSF)	GRAV (%)	SAND (%)	FINE (%)	Gs	LL (%)	PI (%)	Wn (%)	N or > CR <	F s s t	Visual Classification
								31	29	1	[MH] 0.0-20.0' SILT, CLAYEY, DAMP TO MOIST, VERY STIFF TO HARD, REDDISH BROWN TO BROWN
								35	19	2	
								34	45	3	
								35	40	4	
								33	38	5	
										6	
										7	
										8	
										9	
										10	
										11	(TRACE GRAY CLAY MOTTLES)
										12	
										13	
								33	62	14	
										15	
										16	
										17	
								33	75	18	
										19	
										20	

Project Name: JR NCO QUARTERS
 Test Location: SCHOFIELD BARRACKS
 Depth to Water (ft): NOT ENCOUNTERED
 Drill Company: GEOSERVICES HAWAII
 Drill Rig: CME 55
 Inspector: ERIC BJORKEN
 Casing Depth (ft): NA
 Core Recovery (%): NA

Project Number: SC0392
 Boring Number: B8
 Project Name: JR NCO QUARTERS
 Project Location: SCHOFIELD BARRACKS
 Top of Hole (elev): 934.5' MSL
 North: 119.616
 East: 475.450
 Completion Date: 26 JUN 92

PHI degrees	C (TSF)	GRAV (%)	SAND (%)	FINE (%)	Gs	LL (%)	PI (%)	Wn (%)	N or > CR <	F e t	Visual Classification
								27	25	1	[] 2" AC PAVT 6" BASE COURSE ENH 0.5-20.0' SILT, CLAYEY, MOLST, VERY STIFF TO HARD, REDDISH BROWN TO BROWN (TRACE GRAY CLAY MOTTLES)
								29	36	2	
								32	42	3	
										4	
										5	
						66	26	33	43	6	
								34	42	7	
										8	
										9	
										10	
										11	
										12	
										13	
								36	55	14	
										15	
										16	
										17	
								42	38	18	
										19	
										20	

APPENDIX B
LABORATORY TEST RESULTS



PY98 FINEC PN 39037

REPLACE FAMILY HOUSING
AREA "U", SCHOFIELD BARRACKS

PLASTICITY CHART

PLATE B1

PRELIMINARY SOILS INVESTIGATION REPORT
for
FY 99 FHNC PN 47296
FAMILY HOUSING REPLACEMENT, Housing Area I & J
Schofield Barracks, Oahu, HI

June 1998

1.0 PURPOSE AND SCOPE: The purpose of this preliminary soils investigation report is to provide information about the anticipated subsurface materials that maybe encountered during grading and excavation operations. This report also provides preliminary recommendations regarding area grading, subgrade preparation, foundation design, and flexible pavement design for FY99 FHNC PN 47296 Family Housing Replacement, Housing Area I & J, Schofield Barracks, Oahu, Hawaii. The scope of the investigation included subsurface drilling, laboratory testing, engineering analysis, and this geotechnical report.

This project will be administered under a "Turnkey" (design and construct) Contract. As such, no concept designs for the site development or structures are available for use in the preparation of this report. After award of the contract, the Contractor shall retain a qualified geotechnical engineer to further evaluate the subsurface conditions by additional sampling, testing, and analyses, as required, commensurate with the nature of the project. The Contractor's geotechnical engineer shall prepare a Final Soils Investigation Report to document all additional drilling, sampling and testing; selection of soil parameters for design; and the final design of foundations and pavements.

2.0 GEOLOGIC DATA:

2.1 References: "Geology of the State of Hawaii", Harold T. Stearns, 2nd edition, 1985, pages 59 and 115-116.

2.2 Geology: Schofield Barracks is located on the Schofield Plateau between the Waianae and Koolau Ranges. The Schofield Plateaus was formed by lava flows from the Koolau range stopping against the older Waianae range. Alluvium from the Waianae range also butts against and interfingers with the Koolau lava's on the western side of the plateau and along the rim of Kaukonahu Valley. The project area is generally underlain by thick deposits (approximately 15 to 18 meters) of fluvial and residual soils. The basalts in Hawaii slowly decompose by physical and chemical weathering into the red soils observed

boring logs where appropriate. The number of blows to drive the large split barrel sampler have not been converted to equivalent spt values.

Laboratory tests were performed by contract to Geolabs Hawaii. Moisture content, and atterberg limits test results are shown on the boring logs. Atterberg limits, strength, free swell, compaction, California Bearing Ratio (CBR), and consolidation tests are presented in Appendix B. Atterberg limits, CBR, and compaction tests were performed on the bulk surface sample obtained adjacent to boring B1 and B9.

5.0 SUBSURFACE CONDITIONS:

5.1 Subsurface Conditions. The borings indicate the project site is in general underlain by elastic silts and fat clays to 30 feet, the maximum depth drilled. The clays and silts were observed to be plastic, moist, and have consistencies from stiff to hard. No boulders or groundwater was encountered to the maximum depth drilled.

6.0 FOUNDATION DESIGN:

6.1 References.

- a. Army Technical Manual TM 5-818-1, "Soils and Geology: Procedures for Foundation Design of Buildings and Other Structures," October 1983.
- b. Army Technical Report ITL-92-11, "The Seismic Design of Waterfront Retaining Structures", November 1992.
- c. Army Technical Manual TM 5-809-10, "Seismic Design for Buildings", October 1992.
- d. POD ETN 21, Revised Wind, Snow, and Seismic Data for POD, November 19, 1993.

6.2 Discussion. Natural moisture content tests of the soils within the upper 2 meters indicate natural moisture contents are slightly dry of the optimum moisture content of 28 and 30 percent. The CBR test results for remolded soils indicate low swells when the soils are moisture conditioned above optimum moisture content. Free swell test results on undisturbed samples indicate swells of up to 7 percent at the soil's natural moisture content. The remolded on site soils swell potential can be mitigated by placing and compacting the soil above optimum moisture content. Swelling of the in place soils can be mitigated by keeping the subgrade moist.

Based upon the subsurface conditions, excavations can be accomplished using conventional earth moving equipment.

drying the excavation surface and recompact or removing the wet material. Excavation surfaces that become dried out and cracked should be remediated by moisture conditioning and recompact the surface.

6.4 Shallow Foundations. Based upon the N-values of the surface soils, the allowable bearing pressures for footings bearing on undisturbed silt or new compacted fill should be 3000 psf. Allowable bearing pressures may be increased by one third for short term loading such as seismic or wind loads. All footings should bear a minimum 18-inches below the lowest adjacent grade. Isolated and continuous footings should be at least 24-inches wide.

Lateral loads may be resisted by both frictional resistance and passive soil resistance. Ultimate frictional resistance along the footing base can be calculated by multiplying the vertical sustained load by a friction factor of 0.3. Ultimate passive soil resistance is equal to 45 pounds per cubic foot which is expressed as an equivalent fluid weight on the face of below grade structural elements with level backfills. The upper 12-inches of soil should be neglected if the soil is not covered by slabs-on-grade or pavements.

6.5 Seismicity. Reference 6.1.d. identifies Oahu as Seismic Zone 2A. This zone designation corresponds to a "Z" factor of 0.15. Based upon the areal geology and the soil conditions encountered, an S-factor of $S_2=1.2$ is recommended.

6.6 Slabs-on-grade. Slabs-on-grade shall be supported on 4" of compacted Granular Termite Barrier (GTB) over a vapor barrier over 4" of compacted capillary water barrier (CWB) material. The subgrade beneath proposed buildings should be kept continually moist for at least 5 days prior to placement of the CWB.

The vapor barrier shall have the following properties:

Water Vapor Transmission, Method BW	ASTM E-96	not exceeding 0.10 perms
Water Resistance, Dry Indicator	ASTM D-779	greater than 75 hours
Puncture Resistance	ASTM D-781	greater than 50 beach units
Tensile Properties, Method A	ASTM D-882	greater than or equal to 5000 psi

Joints shall be lapped a minimum of (12 inches) and sealed with the manufacturer's recommended mastic or pressure sensitive tape. The vapor barrier shall be lapped over footings or sealed to foundations. The contractor shall check the vapor barrier surface, seams, and penetrations at columns and utilities for damage and discontinuities prior to

IV, Asphalt Viscosity Grade modified AR8000. The asphalt pavement should be compacted to a minimum 91% of theoretical maximum density as determined by ASTM D 2041.

c. The base course should meet State of Hawaii, Department of Transportation, Standard Specifications for Road and Bridge Construction, 1994, 1-1/2 inch maximum size aggregate gradation. The base course should be compacted to 100% of maximum density as determined by ASTM D 1557.

d. The prime coat should meet ASTM D 2027 for MC-30 or MC-70 (cutback asphalt), and should be applied at a rate of 0.15 to 0.40 gallons per square yard. Prime coat should be placed on top of the compacted base course prior to placement of the surface course.

e. The tack coat should meet ASTM D 977 for SS-1 (emulsified asphalt), and should be applied at a rate of 0.05 to 0.20 gallons per square yard. Tack coat should be used to bond new asphalt pavement to any existing asphalt pavement or concrete structures (i.e., curb and gutters).

8.0 POINT OF CONTACT: For additional geotechnical design information or to discuss the recommendations in this report, please contact US Army Corps of Engineers, Honolulu Engineering District, Building 230, Fort Shafter, HI 96858, attention: Civil/Geotechnical Branch, Russell Leong (ph 808-438-7026). The Civil/Geotechnical Branch should be alerted to any significant changes to the project site or design so that additional geotechnical input can be provided.

APPENDIX A
BORING LEGEND AND LOGS

PROJECT NO.: SB-02-98

LOCATION: SCHOFIELD BARRACKS, OAHU

NORTH: NA

EAST: NA

LOGGED BY: E. BJORKEN

[illegible]

PROJECT: FY99 FAMILY HOUSING REPLACEMENT

PROJECT NO.: SB-02-98

BORING NO.: B3

LOCATION: SCHOFIELD BARRACKS, OAHU

ELEVATION: NA

NORTH: NA

DEPTH TO WATER: NOT ENCOUNTERED

EAST: NA

DATE: 28 MAY 1998

LOGGED BY: E. BJORKEN

[illegible]

PROJECT NO.: SB-02-98

LOCATION: SCHOFIELD BARRACKS, OAHU

NORTH: NA

EAST: NA

LOGGED BY: E. BJORKEN

[illegible]

PROJECT: FY99 FAMILY HOUSING REPLACEMENT

PROJECT NO.: SB-02-98

BORING NO.: B7

LOCATION: SCHOFIELD BARRACKS, OAHU

ELEVATION: NA

NORTH: NA

DEPTH TO WATER: NOT ENCOUNTERED

EAST: NA

DATE: 29 MAY 1998

LOGGED BY: E. BJORKEN

[illegible]

PROJECT NO.: SB-02-98

BORING NO.: B9

LOCATION: SCHOFIELD BARRACKS, OAHU

ELEVATION: NA

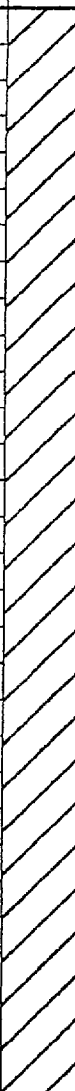

NORTH: NA

DEPTH TO WATER: NOT ENCOUNTERED

EAST: NA

DATE: 28 MAY 1998

LOGGED BY: T. HAYES

DEPTH	SOIL SYMBOL	SAMPLES	BLOWS/ FOOT	CORE RECOVERY	USCS	DESCRIPTION	M.C.	% GRAVEL	% SAND	% FINES	L.L.	P.I.
0			20		CH	FAT CLAY- Silty, plastic, slightly moist, stiff to hard, reddish-brown	30				92	63
			62									
			110									
5			71									
			65									
			44									
			77									
20			27									
			39									
30						BORING TERMINATED AT 30.0'						
35												
40												

APPENDIX B
LABORATORY TEST DATA

Summary of Laboratory Test Results
FY 99 Family Housing Replacement HA I&J
Schofield Barracks, Oahu, Hawaii

Boring No.	Depth (feet)	Moisture Content (%)	Dry Density (pcf)	Atterberg Limits			TXUU		Proctor		California Bearing Ratio (CBR)			Modified Swell		
				LL (%)	PL (%)	PI (%)	Su (ksf)	σ_3 (ksf)	MDD (pcf)	Opt. MC (%)	Molding Moisture (%)	Molding Dry Density (pcf)	CBR Penet. @ 0.1 in.	Molding Moisture (%)	Molding Dry Density (pcf)	Swell (%)
B-1	SURFACE			80	32	48										
B-1	SURFACE								96.5	29.5						
B-1	SURFACE										33.6	91.9	15.3			0.15
B-2	5 - 5.5	27.7	94.4				10.7	0.6								
B-3	0 - 2	26.5														
B-3	4.5 - 5															
B-5	0 - 2	23.8												28.7	93.9	7.0
B-7	0 - 2	18.9														
B-9	0 - 2	23.9														
B-9	4.5 - 5	26.9	86.5				7.3	0.6								
B-9	SURFACE			92	29	63			96.7	27.6						
B-9	SURFACE										33.1	91.5	11			NIL
B-9	SURFACE															

LL: Liquid Limit

PL: Plastic Limit

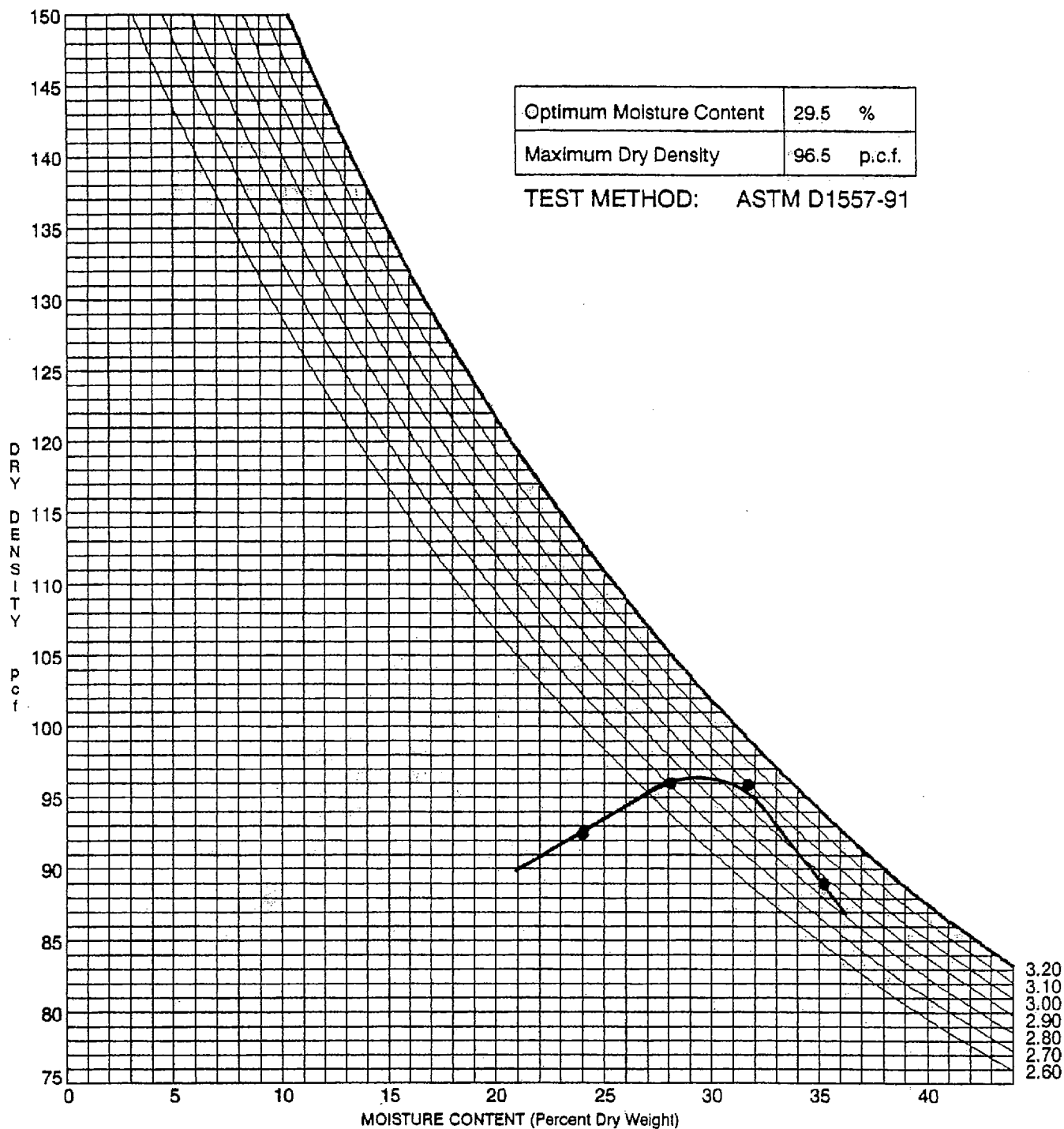
PI: Plasticity Index

TXUU: Undrained Unconsolidated Triaxial Compression Test

Su: Undrained Shear Strength

σ_3 : Confining stress

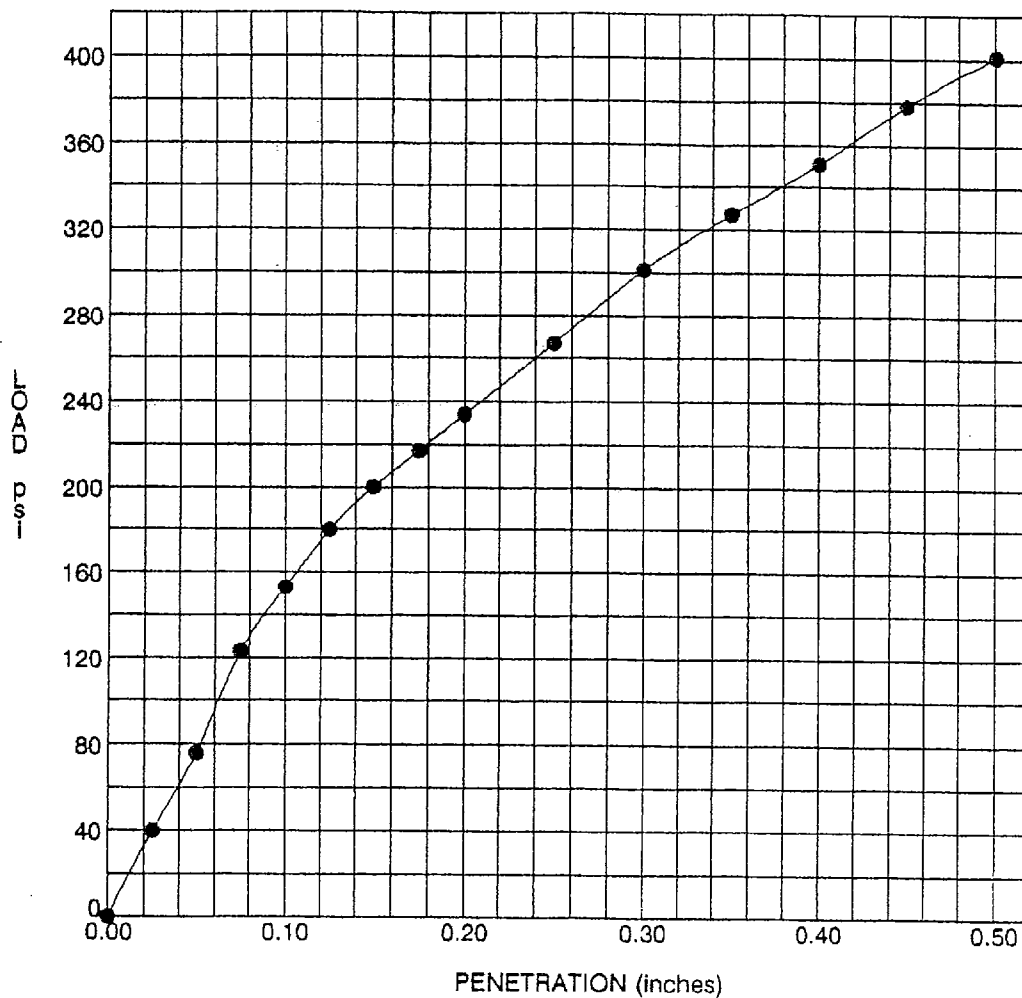
Penet. @ 0.1 in.: Penetration at 0.1 inch



LOCATION: B - 1
 DEPTH (FEET): Surface
 DESCRIPTION: Dark reddish brown SILTY CLAY

PROJECT:
 FY99 FAMILY HOUSING
 REPLACEMENT HA I & J
 SCHOFIELD BARRACKS, OAHU, HAWAII

MOISTURE - DENSITY RELATIONSHIP	
C.W. ASSOCIATES, Inc. dba Geolabs-Hawaii	
DATE Jun 98	W.O. 3826-00(D)



LOCATION: B - 1
 DEPTH (FEET): Surface
 DESCRIPTION: Dark reddish brown SILTY CLAY

AGGREGATE 3/4 inch minus
 HAMMER WT. 10 lbs.
 HAMMER DROP 18 inches
 NO. OF BLOWS 56
 NO. OF LAYERS 5

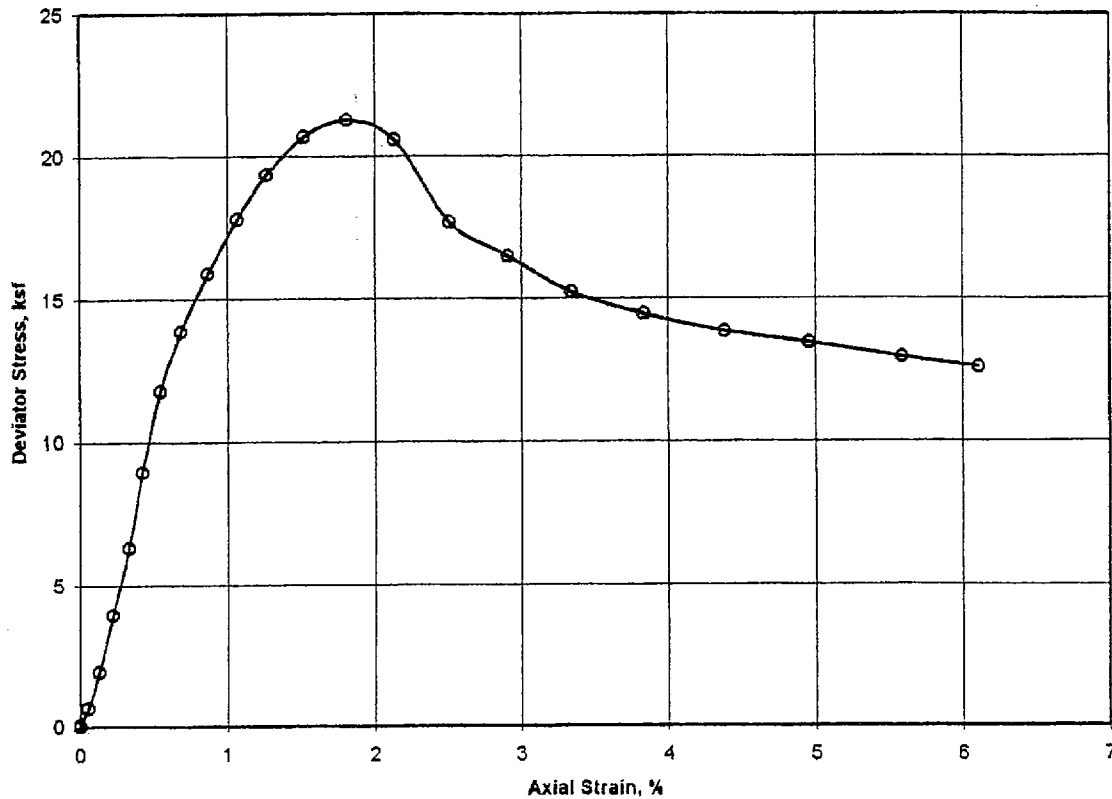
MOLDING MOISTURE (%): 33.6
 MOLDING DRY DENSITY (p.c.f.): 91.9
 CBR @ 0.1" PENETRATION: 15.3
 DAYS SOAKED: 4
 SWELL (%): 0.15

CORRECTED CBR @ 0.1 "
 PENETRATION: $153 \times 100/1000 = 15.3$

PROJECT:
 FY99 FAMILY HOUSING
 REPLACEMENT HA I & J
 SCHOFIELD BARRACKS, OAHU, HAWAII

CBR TEST	
C.W. ASSOCIATES, Inc. dba Geolabs-Hawaii	
DATE Jun 98	W.O. 3826-00(D)

**UNCONSOLIDATED UNDRAINED COMPRESSIVE STRENGTH OF COHESIVE
SOILS IN TRIAXIAL COMPRESSION - ASTM D 2850**



LOCATION: B - 2
 DEPTH: 5 - 5.5 feet

DESCRIPTION: Brown CLAY (CH)

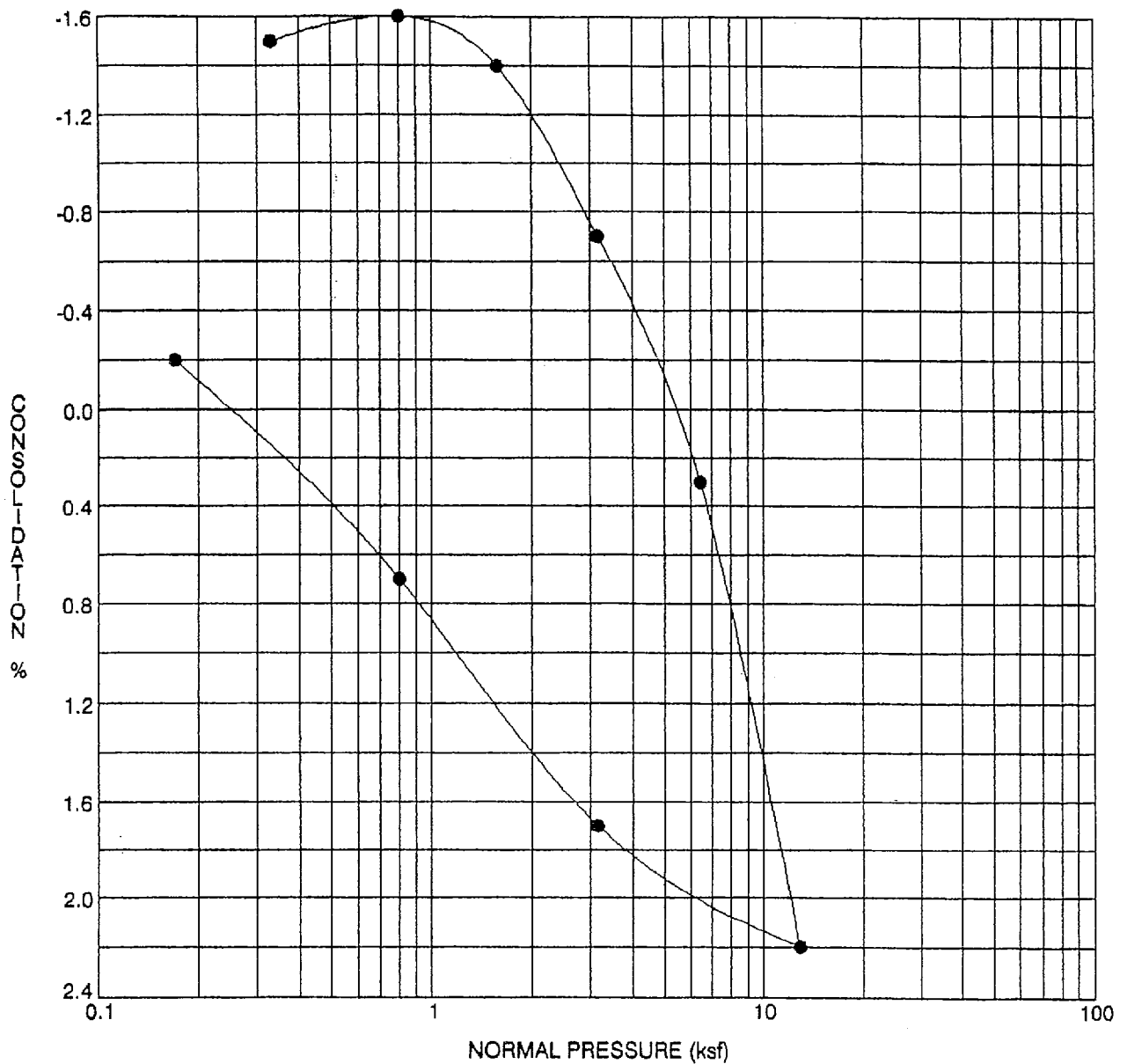
DRY DENSITY:	94.4 pcf	SAMPLE DIAMETER:	2.432 inches
MOISTURE CONTENT:	27.7 %	SAMPLE HEIGHT:	5.527 inches

AT FAILURE

STRAIN RATE =	0.62 %/min.	
CONFINING PRESSURE =	0.6 ksf	
MAX. DEVIATOR STRESS =	21.3 ksf @	1.8 % STRAIN

PROJECT:
 FY 99 FAMILY HOUSING REPLACEMENT, HA I&J
 SCHOFIELD BARRACKS, OAHU, HAWAII

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST	
C.W. ASSOCIATES, Inc. dba Geolabs-Hawaii	
DATE June 98	W.O. 3826-00 (D)



LOCATION: B - 3
 DEPTH (FEET): 4.5 - 5.0
 DESCRIPTION: Brown CLAY

	INITIAL	FINAL
MOISTURE CONTENT (%)	27.9	34.6
DRY DENSITY (p.c.f.)	91.2	92.0

PROJECT:
 FY99 FAMILY HOUSING
 REPLACEMENT HA I & J
 SCHOFIELD BARRACKS, OAHU, HAWAII

CONSOLIDATION CURVE	
C.W. ASSOCIATES, Inc. dba Geolabs-Hawaii	
DATE Jun 98	W.O. 3826-00(D)

CONSOL

ATTACHMENT 7
LIST OF DRAWINGS

LIST OF DRAWINGS

RING NO.	DRAWING NO.	SHT NO.	TITLE
FY01 FHNC PN48456 REPLACE FAMILY HOUSING, AREA "T", "J", "U", AND "W" SCHOFIELD BARRACKS, OAHU, HAWAII			
1	711-15-98	T-1	COVER SHEET
2	711-15-98	T-2	SCHEDULE OF DRAWINGS
3	711-15-98	T-3	PROJECT LOCATION MAP
<u>CIVIL</u> <u>SCHOFIELD BARRACKS INSTALLATION UTILITY SYSTEM</u> <u>MAPS: 1 "400' SCALE</u>			
4	711-15-98	CU-1	FRESH WATER DISTRIBUTION SYSTEM
5	711-15-98	CU-2	SANITARY SEWER SYSTEM
6	711-15-98	CU-3	GENERAL STORM DRAINAGE SYSTEM
7	711-15-98	CU-4	SCHOFIELD BARRACKS ELECTRICAL DISTRIBUTION
8	711-15-98	CU-5	GENERAL TELEPHONE SYSTEM MAP
<u>PROJECT TOPOGRAPHIC SURVEY</u>			
9	711-15-98	CT-1	NEW CONSTRUCTION SITE TOPOGRAPHIC SURVEY AND TREE REMOVAL/PRESERVATION SCHEDULE - AREA "J"
<u>FY98 FHNC 136 NEW FAMILY HOUSING REPLACEMENT -</u> <u>AREA "U"; PN39037 ; 1" = 40' SCALE (AS-BUILT DRAWINGS)</u>			
10	711-15-70	C-7	GRADING AND DRAINAGE PLAN 1 OF 2
11	711-15-70	C-8	GRADING AND DRAINAGE PLAN 2 OF 2
12	711-15-70	C-9	STORM DRAIN PLAN 1 OF 2
13	711-15-70	C-10	STORM DRAIN PLAN 2 OF 2
14	711-15-70	C-16	SEWER PLAN 1 OF 2
15	711-15-70	C-17	SEWER PLAN 2 OF 2
16	711-15-70	C-19	WATER PLAN 1 OF 2
17	711-15-70	C-20	WATER PLAN 2 OF 2
18	711-15-70	CE-2	ELECTRICAL DISTRIBUTION PLAN, AREA "U"
<u>FY99 FHNC 64 NEW FAMILY HOUSING REPLACEMENT -</u> <u>AREA "T" & "J"; PN47296 ; 1" = 40' SCALE (CONTRACT</u> <u>DRAWINGS)</u>			
19	711-15-91	C-6	GRADING AND DRAINAGE PLAN

Attachment 7

20	711-15-91	C-7	STORM DRAIN PLAN
21	711-15-91	C-11	SEWER AND WATER PLAN
22	711-15-91	CE-3	ELECTRICAL DISTRIBUTION PLAN, AREA "J"

FY00 TO FY05 MASTER PLANS FOR WHOLE BARRACKS
RENEWAL, PHASE 2 AREAS I, J, K SCHOFIELD BARRACKS,
OAHU, HAWAII

23	711-15-98	MP-1	IJK MASTER PLAN
----	-----------	------	-----------------

ELECTRICAL

24	711-15-98	E-1	OCEANIC CABLE STANDARD DETAIL - 2448 24" X 48" PULL BOX
25	711-15-98	E-2	OCEANIC CABLE INSTALLATION DETAIL - ELECTRO POWER SUPPLY

ATTACHMENT 8

INSTALLATION COMPATIBLE USE ZONE (ICUZ)

within the Ammunition Storage Point (ASP), Wheeler, under the supervision of the USASCH Directorate of Logistics. Ammunition resupply is provided from the main storage facility at Lualualei Naval Magazine.

For safety reasons, 105mm artillery propellant is reduced from charge 5 to charge 3 prior to transportation from Wheeler's ASP to a Schofield artillery range Ammunition Transfer Point. A visual check of propellant charges is conducted at that point prior to delivery of ammunition and propellant to the guns. Any propellant not expended may be burned at one designated burn pit north of Area X. No ESQD is required at the burn pit. The major safety factor is fumes from the burn; an area 50 feet downwind is kept clear of personnel.

1.3.2 Surface Danger Zones (SDZ)

Surface danger zones are associated with live ammunition firing at range training facilities. Schofield Barracks' SDZs exist roughly within an arc formed by Area X (the eastern boundary), Trimble Road (the southern boundary) and the Waianae Mountain Range as the western boundary. The direction of fire is generally west to north. The area supports small arms, mortar and artillery training. No live TOW missiles, air-to-ground, or ground-to-air firing is conducted at Schofield's ranges.

The Makua Military Reservation on Oahu's west coast is the site of the Company Combined Arms Assault Course. This range lies within Makua Valley, a natural amphitheater with elevations reaching over 2,000 feet. Direction of fire is east toward the Waianae Mountain Range. The impact area is restricted to the valley floor and up to 900 feet elevation. Makua's ranges support infantry fire and maneuver, plus air-to-ground helicopter aerial gunnery fire. No ground-to-air gunnery is allowed.

East Range has no SDZ since the range is now restricted to bivouac, maneuver, and non-live fire training activities.

1.3.3 Installation Compatible Use Zone (ICUZ)

Noise sources on Schofield Barracks are primarily associated with artillery from the firing ranges and with aircraft from Wheeler. The United States Army Environmental Hygiene Agency conducted a noise study for Schofield Barracks and Makua Military Reservation in 1988 to determine the noise impact associated with the firing ranges. An environmental noise assessment for Wheeler operations was performed in 1986 by VTN Pacific, Inc., BBN Laboratories, Inc., and Wil Chee Planning.

Noise limits for Zone I areas are < 65 dBA (ADNL), < 62 dBC (CDNL), < 87 dBP (peak level), and are considered acceptable for housing. Zone II areas are 65-75 dBA, 62-70 dBC, and 87-104 dBP. Zone III limits are > 75 dBA, > 70 dBC, and > 104 dBP. It was determined that the noise Zone II for Schofield Barracks firing ranges encroaches over 1,000 meters into on-post housing areas (see Figure IV-1). Included in this area are Solomon Elementary School and Chapel facilities. These facilities are not normally considered compatible with the Zone II noise environment. Makua Military Reservation has Zones II and III encroaching into adjacent undeveloped areas as shown in Figure IV-4 (USAEHA, 1988).

Other portions of Schofield are located beneath the flight path of the main runway on Wheeler. Primarily affected are the Main Post service and training areas along the southern boundary near Kunia Road and the Leilehua Golf Course and adjoining area to the north on the East Range. Area flight patterns and minimum altitudes have been established to meet safety requirements

and noise abatement restrictions. As shown in Figure IV-4, the Zone II contour crosses the southern-most tip of Duck Field on Schofield Barracks. The Zone II contour does not reach the west end of the East Range (see Figure IV-2) (VTN Pacific et al., 1986). A revised ICUZ study is planned for Wheeler and may result in revisions to the boundaries of the noise contours.

1.3.3.1 Accident Potential Zones (APZs)

In addition to aircraft noise, the potential for aircraft accidents is a major consideration in assessing the compatibility of an air installation with the surrounding community. The ICUZ incorporates Accident Potential Zones (APZs), which are areas where aircraft accidents would most likely occur.

The clear zone and APZs to the west of the Wheeler runway do not encroach upon Schofield Barracks. The extension of the Wheeler runway centerline to the east passes through portions of the East Range. The installation is therefore within the clear zone and APZs I and II of the Class A runway. The definition of the various zones and the compatible land use within these zones are set forth in TM 5-803-7.

Currently, portions of the third, fourth, fifth, and sixth holes of Leilehua Golf Course are within the runway clear zone (see Figure IV-2). This land use is also not compatible under DOD guidelines (TM 5-803-7, Airfield and Heliport Planning Criteria, 12 May 1981, Attachment 3). The back nine holes, located within the APZ-I are in conformance as is the location the clubhouse (VTN Pacific, Inc. et al., 1986).

1.3.4 Governmental Boundaries

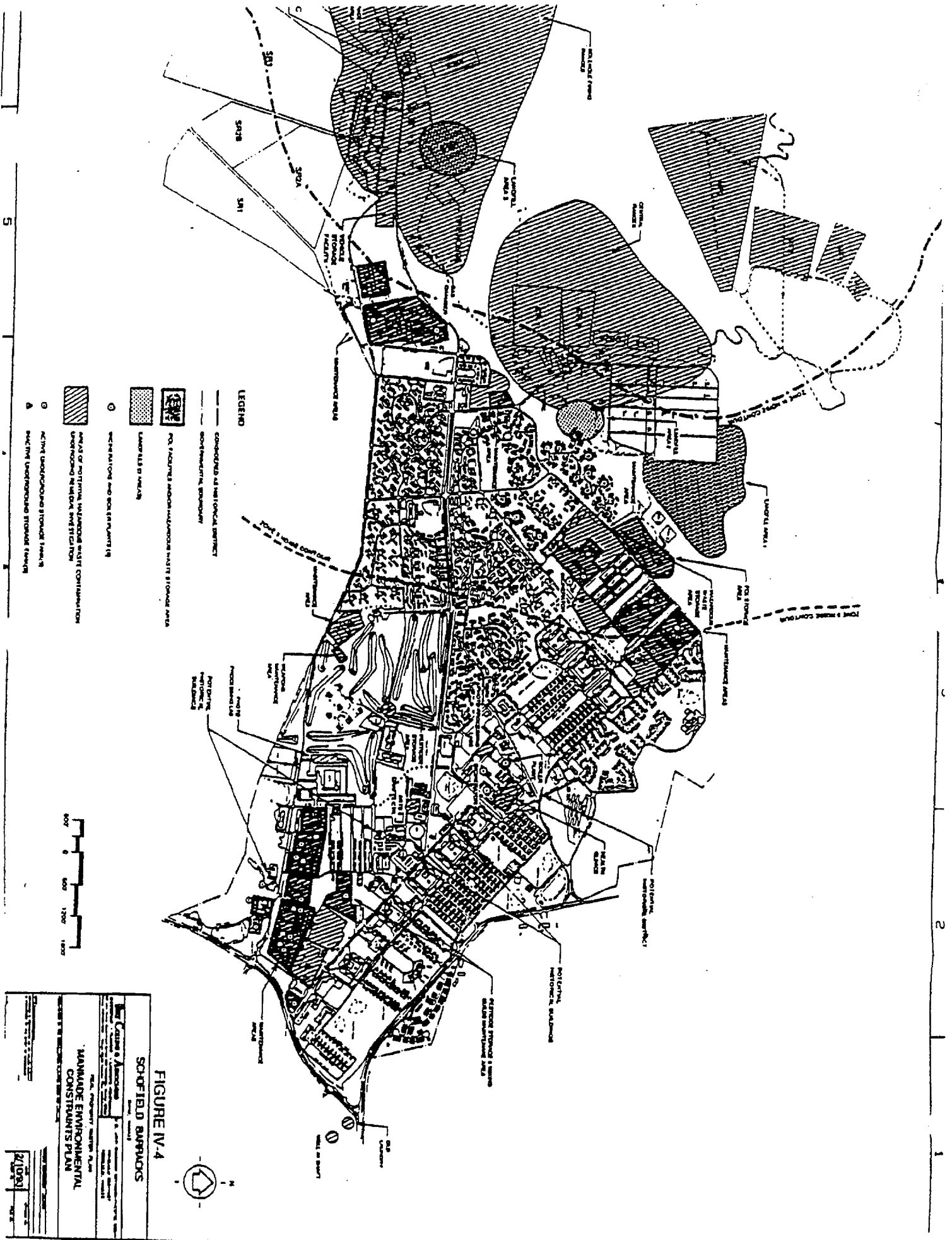
The boundaries for Schofield Barracks, East Range, and Makua are shown on each of the Environmental Overlays, Figures IV-1 through IV-4.

1.3.5 Electromagnetic Hazard Sites (EMR)

Electronic constraints are associated with the MARS facility, which has posted hazards from electromagnetic radiation to personnel (HERP) signs around the perimeter of the cleared antennae field. No official radiation studies appear to have been performed to verify the adequacy of this clear zone.

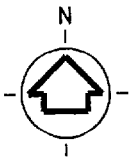
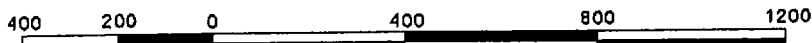
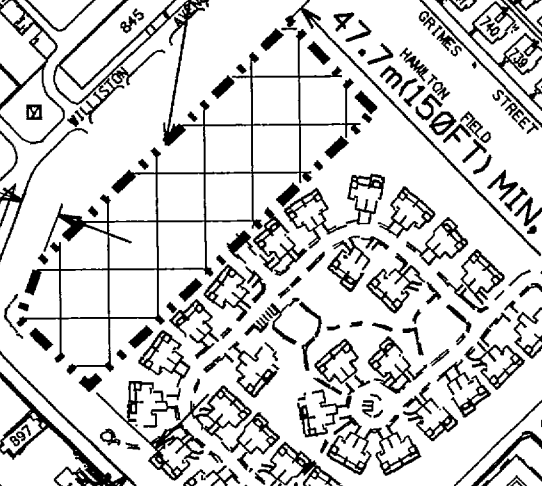
1.4 ENVIRONMENTAL COMPLIANCE ASSESSMENT SYSTEM (ECAS)

The Army has initiated a new program to perform comprehensive, environmental compliance assessments at every Army installation in CONUS and OCONUS over the next four years. This system establishes a standard protocol to be followed in assessing compliance with applicable federal, state, and local environmental requirements and historic preservation measures, to support corrective action planning and budgeting. The assessments will be conducted for the MACOM by experienced contractors managed by the Corps of Engineers District Office. The results will provide more detailed information for real property planners and will become an additional base reference for the installation's real property master plan.



ATTACHMENT 9
NEW CONSTRUCTION SITE PLAN

FY01 AREA "J"
NEW CONSTRUCTION SITE
APPROXIMATELY 4.9 ACRES

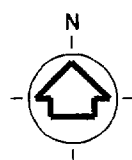
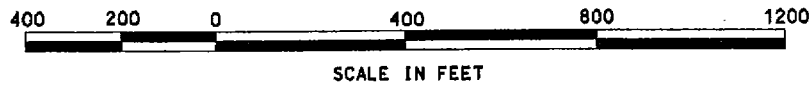
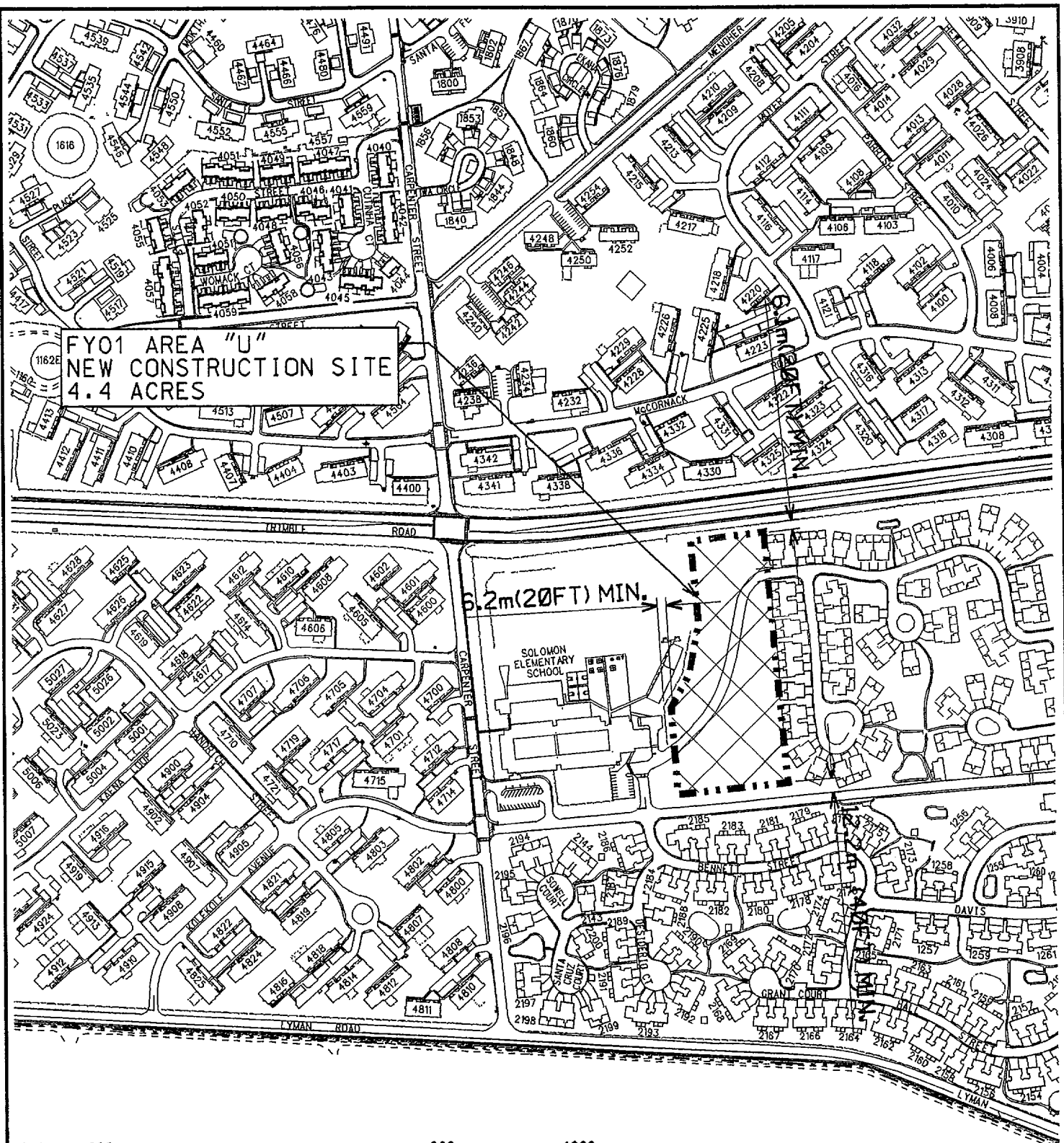


FY01 FHNC PN 48456 REPLACE FAMILY HOUSING,
AREAS "I", "J", "U" AND "W"

NEW CONSTRUCTION SITE PLAN -1
FAMILY HOUSING AREA "J"

APRIL 2000

ATTACHMENT 9



FY01 FHNC PN 48456 REPLACE FAMILY HOUSING. AREAS "I", "J", "U" AND "W"	
NEW CONSTRUCTION SITE PLAN -2 FAMILY HOUSING AREA "U"	
APRIL 2000	ATTACHMENT 9

ATTACHMENT 11
TYPICAL GTB DETAILS

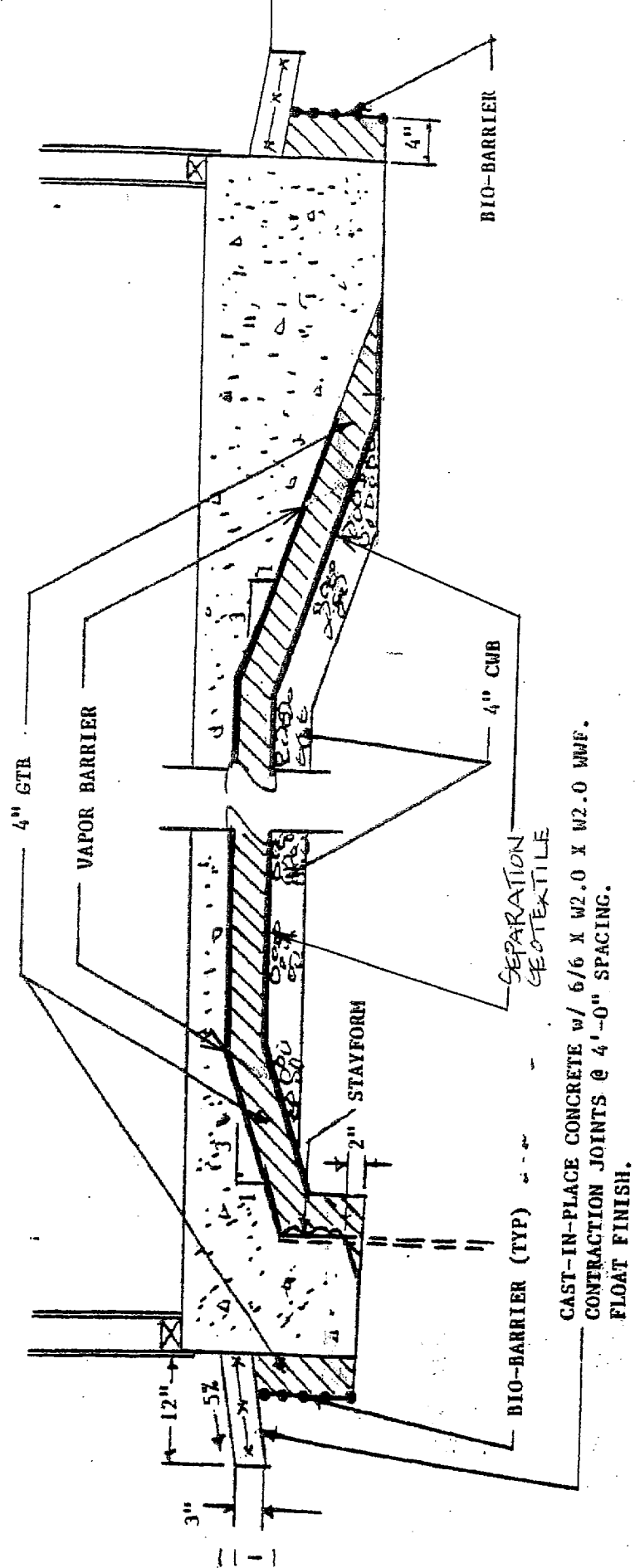


FIGURE 1 - TYPICAL GTB DETAILS AT EXTERIOR FOOTINGS
NOT TO SCALE

20 June 1996

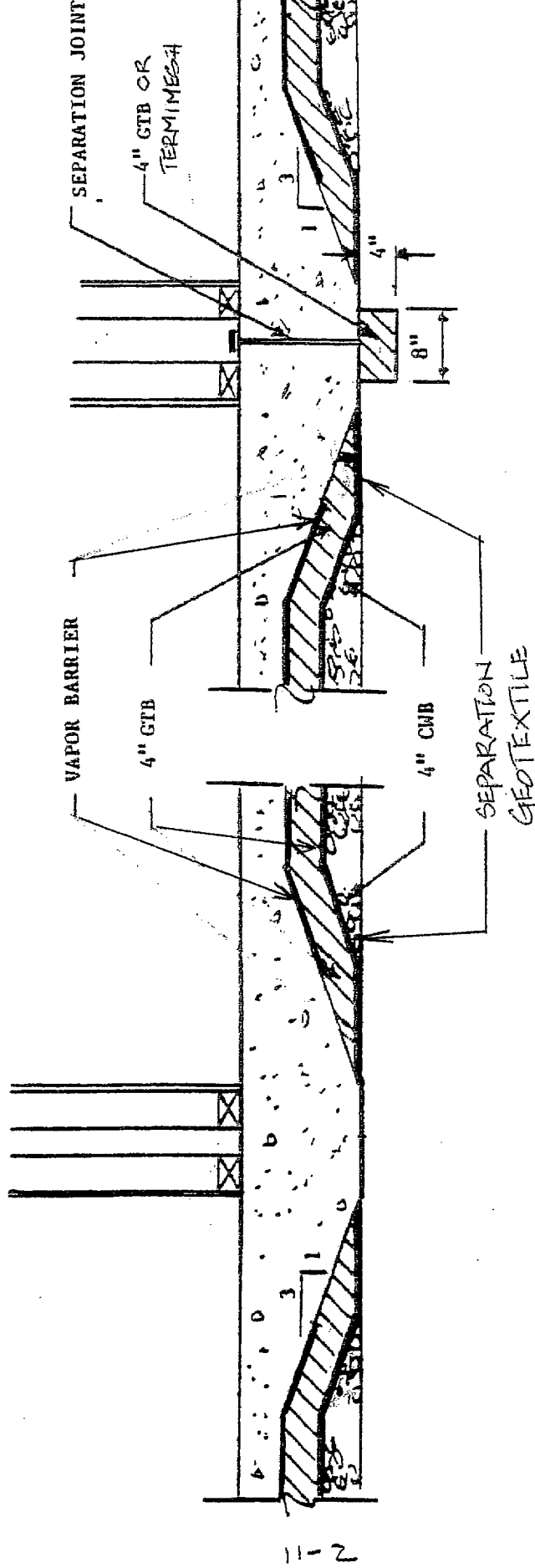


FIGURE 2 - TYPICAL GTB DETAILS AT INTERIOR FOOTINGS
NOT TO SCALE

20 June 1996

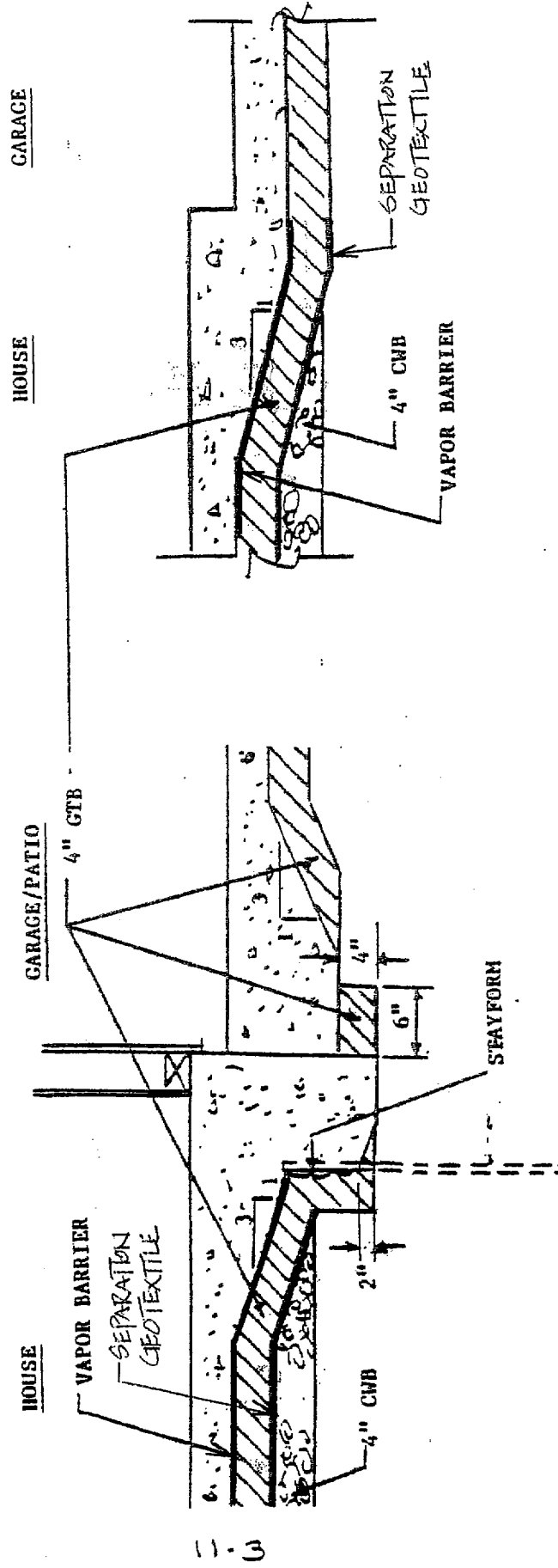


FIGURE 3 - TYPICAL GTB DETAILS AT HOUSE TO GARAGE/PATIO INTERFACE
NOT TO SCALE

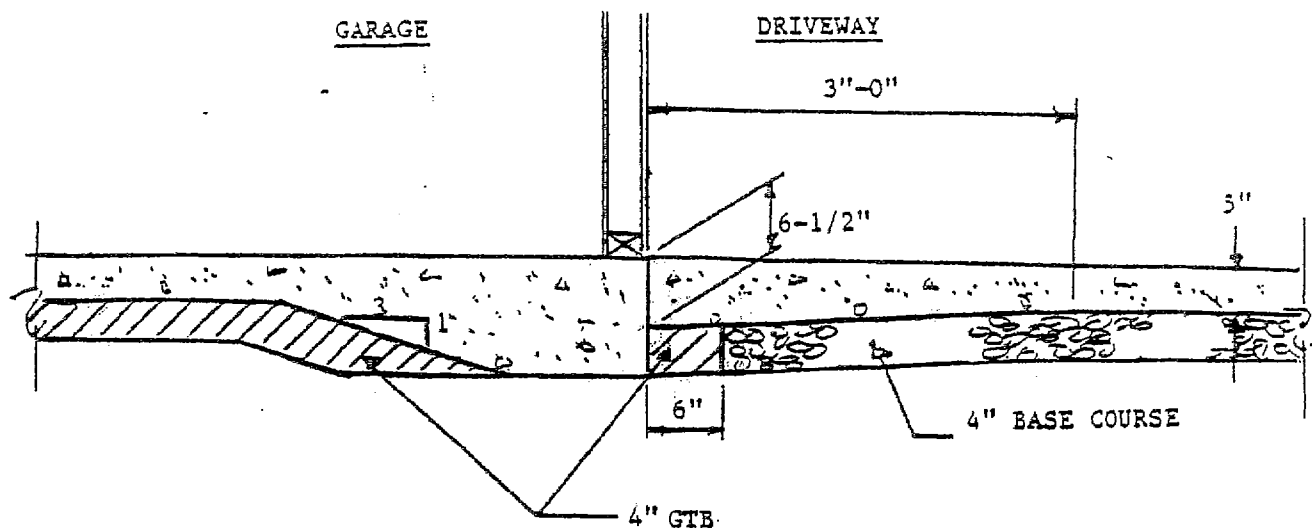


FIGURE 4 - TYP. GTB DETAILS AT GARAGE TO DRIVEWAY INTERFACE
NOT TO SCALE

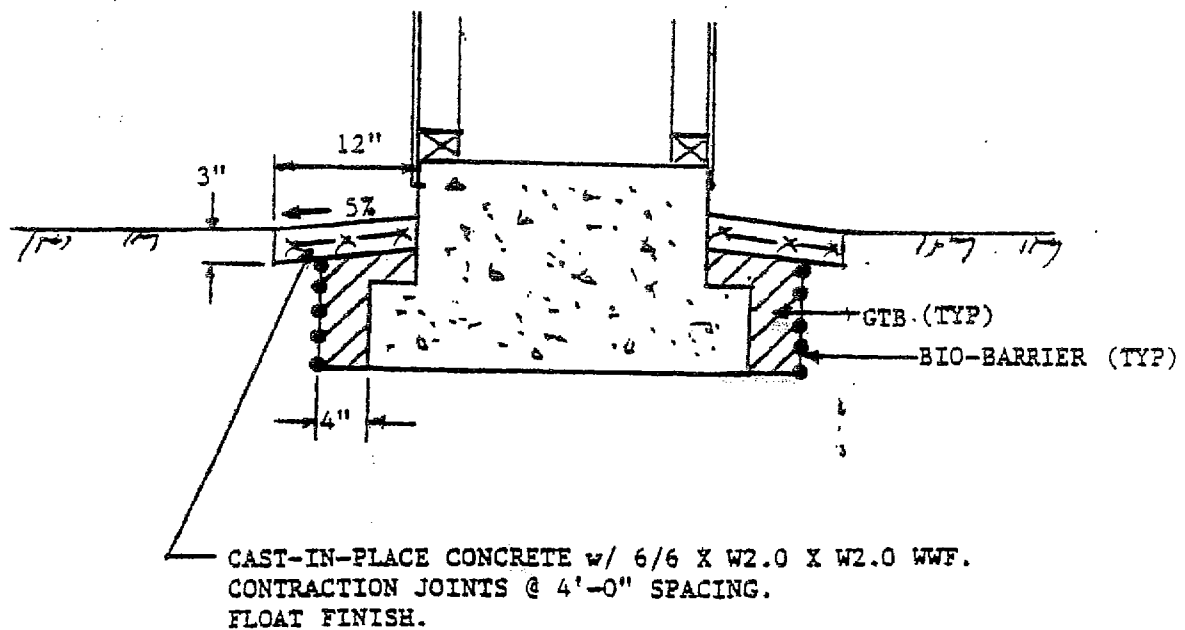


FIGURE 5 - TYP. GTB DETAILS AT EXTERIOR COLUMN FOOTINGS
NOT TO SCALE

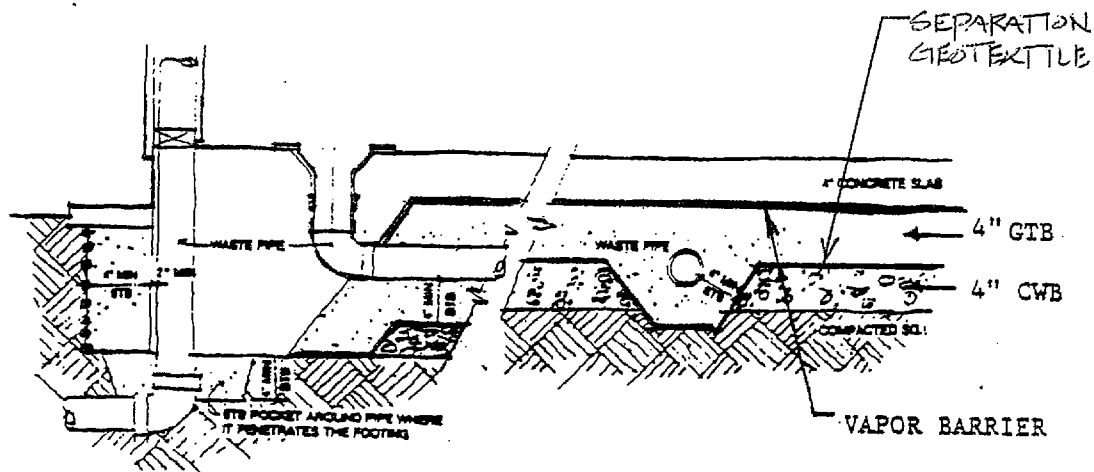


FIGURE 6 - TYP. GTB DETAILS AT SUBSLAB DRAIN PIPING
NOT TO SCALE

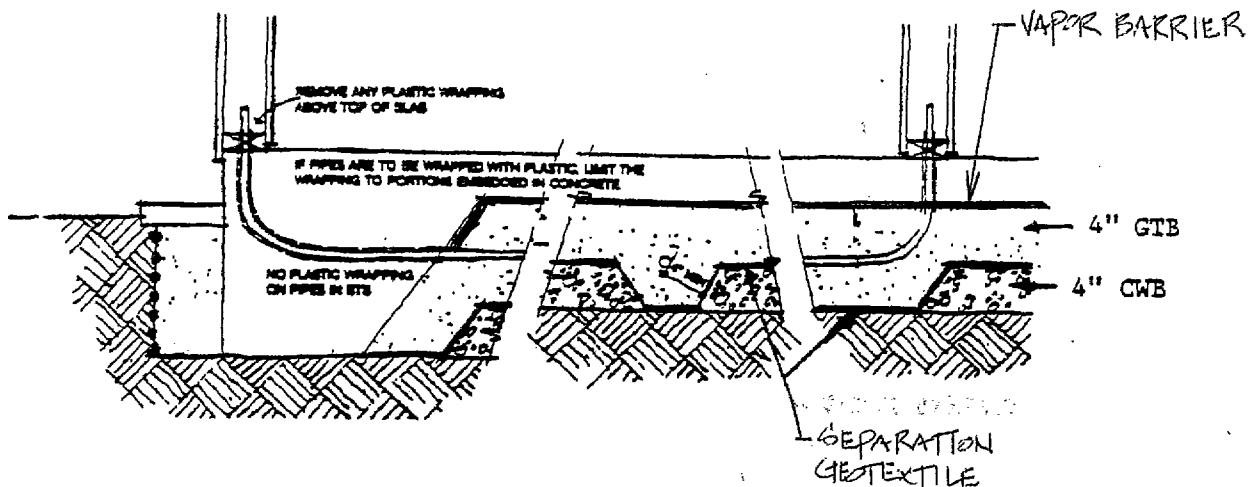


FIGURE 7 - TYP. GTB DETAILS AT SUBSLAB CONDUITS/WATER PIPING
NOT TO SCALE

ATTACHMENT 13

SMALL DISADVANTAGED BUSINESS SUB CONTRACTING PLAN

SAMPLE
SMALL BUSINESS AND SMALL DISADVANTAGED BUSINESS
SUBCONTRACTING PLAN

CONTRACTOR: _____

ADDRESS: _____

SOLICITATION OR CONTRACT NUMBER: _____

DESCRIPTION:

1. The information herein provided, together with any attachments and subsequent amendments, is submitted as a subcontracting plan to satisfy the applicable requirements of P.L. 99-661 Section 1207, P.L. 100-180 Section 806, and FAR 52.219-9 (Jan 1991).

2. The following percentage goals, expressed in terms of a percentage of total planned subcontracting dollars, are applicable to the solicitation cited above or to the contract awarded under the solicitation cited.

a. The total estimated percentage of all planned subcontracting to all types of business concerns under this contract is (Insert whole dollars & percentage).

b. Small Business Concerns: (Insert whole dollars & percentage) of total planned subcontracting dollars under this contract is estimated to go to subcontractors who are small business concerns.

c. Small Disadvantaged Business Concerns: (Insert whole dollars & percentage) of total planned subcontracting dollars under this contract is estimated to go to subcontractors who are small business concerns owned and controlled by socially and economically disadvantaged individuals.

d. Women-Owned Business Concerns: (Insert whole dollars & percentage) of total planned subcontracting dollars under this contract is estimated to go to subcontractors who are women-owned business concerns.

e. Option Years: (State the goals for the option years. If the same percentages will be used, state, "Same percentages as noted above will be used for each option year." If there are no option years, leave this portion out of your plan.)

3. The following principle types of supplies and services are anticipated to be subcontracted under this contract, and the distribution among small business concerns, small disadvantaged business concerns, and women-owned business concerns is as follows:

a. Supplies and services to be subcontracted to qualified small business concerns: *S & S- soil drilling, ITC Testing Inc.- material testing.*

b. Supplies and service to be subcontracted to qualified small disadvantaged business concerns: *John Doe Surveying, Always Safe- security escort, S & D- soil drilling, Right Inc.- analytical testing.*

c. Supplies and services to be subcontracted to qualified women-owned business concerns: *Bio-Spec- laboratory analysis, Nature Inc.- hazardous waste analysis.*

4. The method used to develop the subcontracting goals in paragraph 2. above involved: Identifying local business firms that are capable of performing the services required by the disciplines indicated above and familiar with the installations and geographic locations .

5. The method used to identify potential sources for solicitation purposes involve:

a. *Small Business Administration's Procurement Automated Source System (PASS).*

b. *Corps of Engineers vendor listing.*

c. *General Contractor's Association*

6. Within the goals specified in paragraph 2. above, (A statement as to whether or not you included indirect costs in establishing subcontractor goals, and a description of the method used to determine the proportionate share of indirect costs to be incurred with (i) small, (ii) small disadvantaged and (iii) women-owned business concerns).

7. The following individuals will administer the subcontracting program:

Name: _____

Address: _____

Contractor Establishment Code: _____

Telephone: () _____

FAX: () _____

The duties of the above named person(s) involve: development, preparation and execution of individual subcontracting plans and for requirements contained in this plan, such as :

a. Developing and maintaining professional services firms, technical subcontractors and supplier lists of small, small disadvantaged, and women-owned business concerns.

b. Assure small business concerns, small disadvantaged business concerns, and women-owned business concerns are considered for assignments in which they are capable of performing.

c. Monitoring the progress toward your proposed subcontracting goals.

d. Preparing and submitting periodic subcontracting reports to include the Standard Form (SF) 295 Summary Subcontract Report and the SF 294 Subcontracting Report for Individual Contracts.

e. Notifying the Contracting Officer of any deviation from this subcontracting plan.

8. The following outreach efforts will be taken to assure small business concerns and small disadvantaged business concerns will have an equitable opportunity to compete for subcontracts:

a. Sources will be requested from the Small Business Administration's Procurement Automated Source System (PASS).

b. Sources will be requested from business development organizations such as the Chamber of Commerce and Regional Minority Development Councils.

c. Participation in small, disadvantaged and women-owned business trade fairs.

9. The offeror agrees that the clause in this contract entitled "Utilization of Small Business Concerns and Small Disadvantaged Business Concerns" will be included in all subcontracts which offer further subcontracting opportunities, and all subcontractors except small business concerns who receive subcontracts in excess of \$500,000 for services and \$1,000,000 for construction will be required to adopt and comply with a subcontracting plan similar to this one. The acceptability of percentage goals shall be determined on a case-by-case basis depending on the supplies or professional services involved, the availability of potential small, small disadvantaged, and women-owned business subcontractors, and prior experience.

10. The offeror agrees to :

- a. Cooperate in any studies or surveys as may be required.
- b. Submit periodic reports in order to allow the Government to determine the extent of compliance by the offeror with the subcontracting plan.
- c. Submit on a semiannual basis, Standard Form (SF) 294, Subcontracting Report for Individual Contracts, and SF 295, Summary Subcontract Report, in accordance with the instructions on the forms and the administering contracting office.
- d. Ensure that its subcontractors agree to submit SF 294 and SF 295, if applicable.

11. The offeror agrees to maintain the following types of records to demonstrate compliance with this subcontracting plan:

- a. Small Business Concerns, Small Disadvantaged Business Concerns, and Women-Owned Business Concerns source lists, guides, and other data lists.
- b. Organizations contacted for small, disadvantaged, and women-owned business sources.
- c. On a contract-by-contract basis, records on each subcontract solicitation resulting in an award of more than \$100,000, indicating: (1) whether small business concerns were solicited and if not, why not, (2) whether small disadvantaged business concerns were solicited and if not, why not, and (3) if applicable, the reason award was not made to a small business concern.
- d. Records to support other outreach efforts: contracts with business development organizations, chamber of commerce, and participation in business trade fairs.

13. Provide a narrative on past performance of meeting/not meeting or exceeding your subcontracting goals.

14. Provide a statement on how you will foster Historical Black Colleges /Universities and Minority Institutions and that you will give them equitable opportunity to compete on any of the subcontracting disciplines that may be applicable to Colleges, Universities, or Minority Institutions.

Signed: _____
Typed Name: _____
Title: _____
Date: _____

Typed Name: _____
Signed: _____ Date Approved: _____
Small and Disadvantaged
Business Utilization Specialist

Typed Name: _____
Signed: _____ Date Approved: _____
Procurement Center Representative
Small Business Administration

Plan Accepted by: _____
Contracting Officer

Date of Acceptance: _____

ATTACHMENT 14

TREE PROTECTION DURING DEMOLITION AND CONSTRUCTION

ATTACHMENT 14
TREE PROTECTION DURING DEMOLITION AND CONSTRUCTION

General

1. The Contractor shall retain the services of an arborist who has been certified for at least 5 years with experience in tree protection during construction, tree pruning and transplanting trees. The Contracting Officer shall approve the selection of the certified arborist. The arborist shall provide consulting services and perform quality assurance duties during the contract period. The arborist shall ensure tree branch and root pruning and relocation work is performed in accordance with standards of the National Arborists Association and the International Society of Arboriculture; proper measures are taken to protect the trees' canopy and root system from unnecessary damage from construction activity; when potentially damaging construction activity is performed that such activity is performed in a manner that will minimize damage to the tree; and trees are provided proper care and remain in good health during the demolition and construction period.
2. The Contractor shall arrange a pre-construction meeting attended by the Contractor, sub-contractors, Contracting Officer and selected consultants, and the Contractor's certified arborist to review procedures for performing tree-related work, work in the areas of saved trees, access routes, storage areas, and measures to protect trees during construction.
3. Protection Fence. The Contractor shall erect a temporary fence around each saved tree such that the fence encloses the tree protection zone as a minimum (Diagram 1). The ear pod tree located at Quarters 701, Bragg Street, requires additional protection since it is a State of Hawaii Exceptional Tree. The fence around this exceptional tree shall be erected to enclose a protection zone as shown in Diagram 2. The fences shall be erected prior to the commencement of any work and shall not be removed until all work that is potentially injurious to the trees are completed. If an existing structure prevents proper enclosure of the tree protection zone prior to demolition, the Contractor shall initially erect the fence around the tree to the extent that is reasonably possible. After demolition, the fence shall be reconfigured to enclose the tree protection zone. Protection fences shall not be relocated or removed without the written permission of the arborist.
4. Limitation of Construction Activities under Existing Tree Canopies. The Contractor shall limit activities under the canopy of existing trees to only those activities explicitly required to complete the construction under and/or adjacent to the tree's canopy as shown and specified. All excavation work required under the canopy of the tree shall be performed under the direction of the arborist. Material and topsoil stock piling, vehicle parking, temporary roadways, construction material mixing, portable latrine, and field office will not be allowed under the canopy. Spoils, waste, and washout water shall not be deposited or stored, either temporarily or permanently, under the canopy.

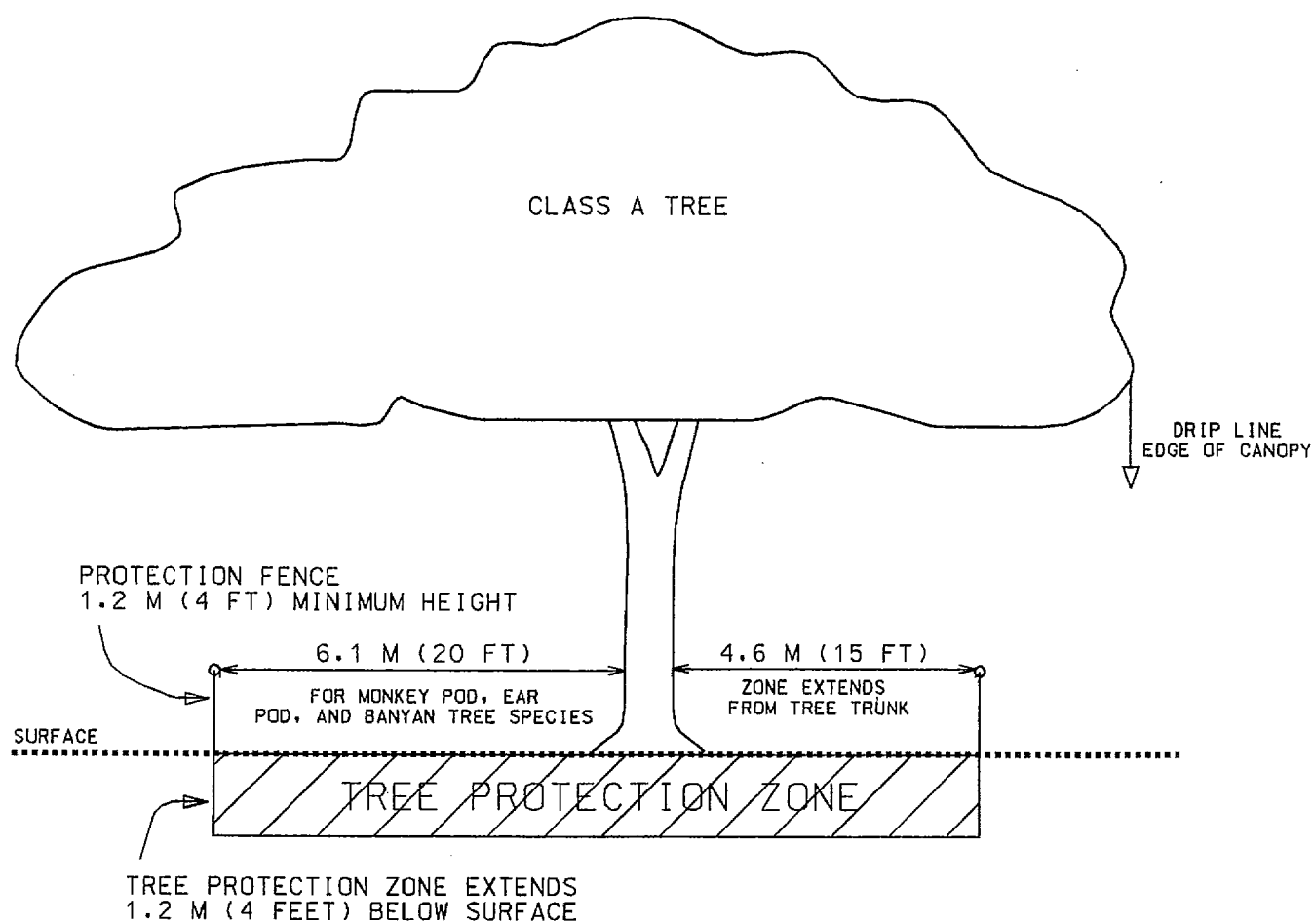
5. Tree Pruning. A certified tree worker under the general supervision of a certified arborist shall perform the tree pruning and root pruning work.

6. If injury should occur to any tree during construction, the Contractor shall immediately report the injury to the certified arborist. The certified arborist shall evaluate the injury and apply appropriate treatments. The Contractor shall submit a written report of the tree injury and treatment to the Contracting Officer.

7. Tree Maintenance. The Contractor shall irrigate the trees as necessary to maintain their health during the course of the demolition and construction period. Groundcover growth within the fenced-in area shall be maintained at a height not to exceed 250 mm (10 in). The application of herbicides is prohibited under the canopy of the trees.

8. Root Pruning. Before grading, pad preparation, or excavation for foundations, footings, walls, or trenching, roots that are greater than two (2) inches in diameter shall be pruned by manually digging a trench and cutting exposed roots with a saw, vibrating knife, rock saw, narrow trencher with sharp blade, or other approved root pruning equipment. Any roots damaged during grading or construction shall be exposed to sound tissue and cut cleanly with a saw.

9. If temporary haul or access roads must pass over the root area of trees, a roadbed of 6 inches of mulch or gravel shall be created to protect the soil. The roadbed material shall be replenished as necessary to maintain a 6-inch depth.

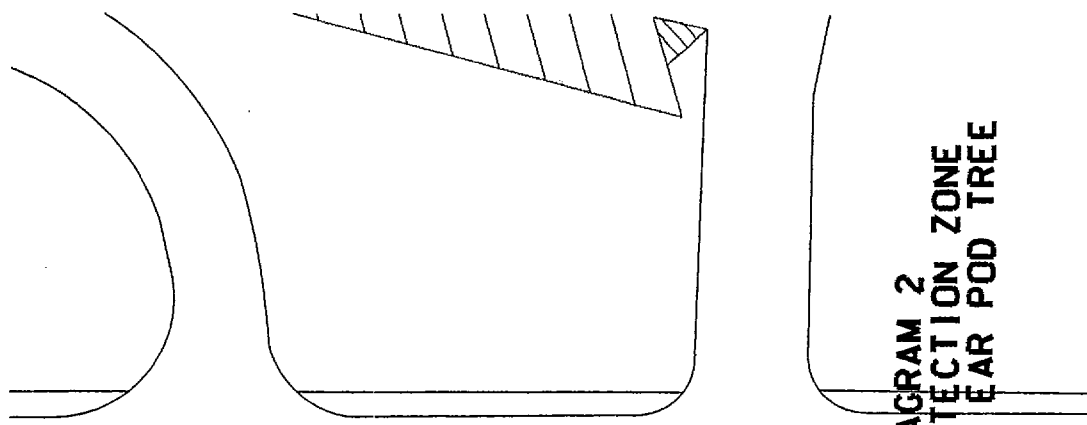


FY01 FHNC PN 48456 REPLACE FAMILY HOUSING.
AREAS "J", "J", "U" AND "W"

DIAGRAM 1
TREE PROTECTION ZONE

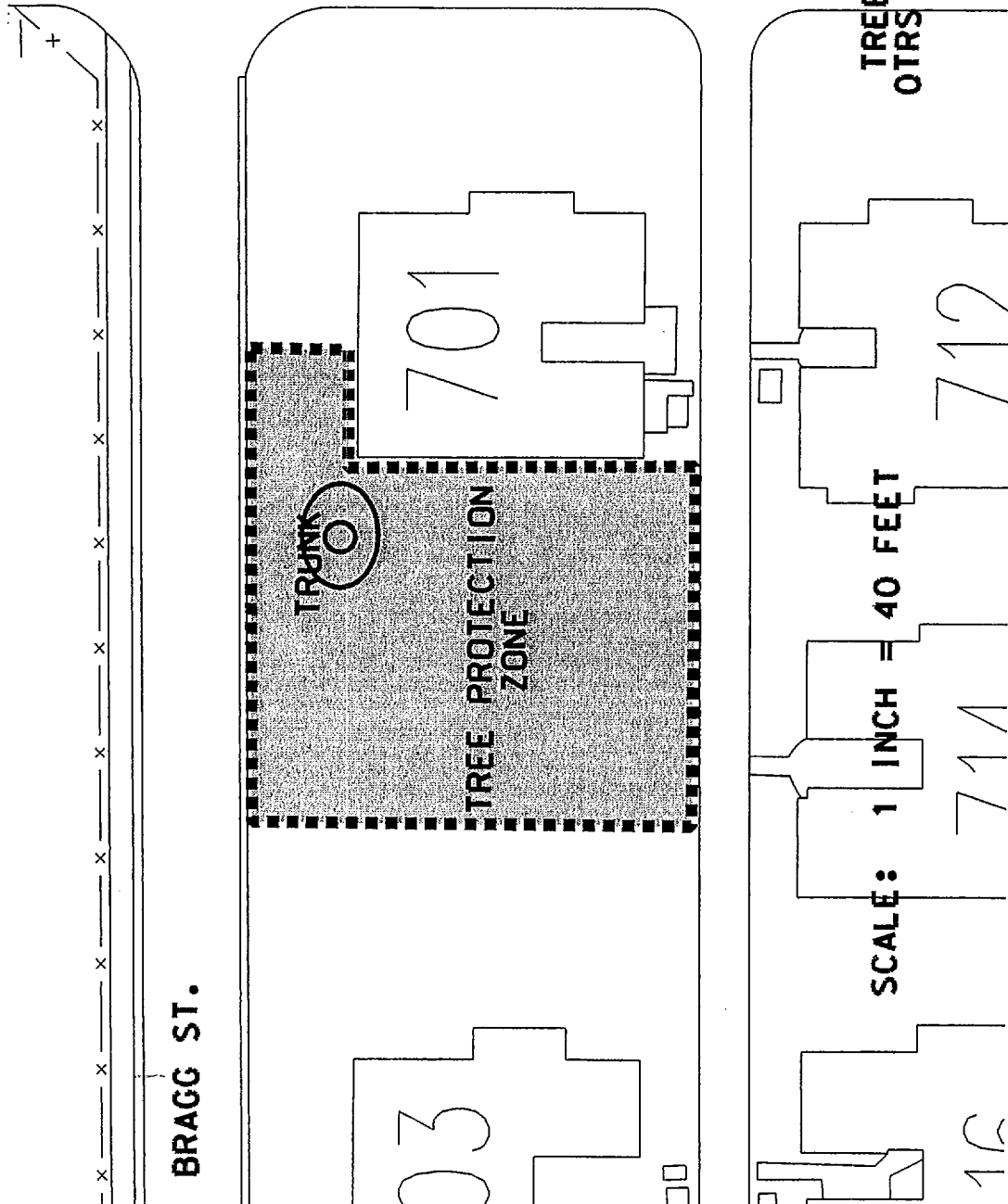
OCTOBER 2000

ATTACHMENT 14



AYRES AVE.

DIAGRAM 2
TREE PROTECTION ZONE
OTRS 701, EAR POD TREE



BRAGG ST.

SCALE: 1 INCH = 40 FEET

1C

712

711

1C

ATTACHMENT 15

MISCELLANEOUS PROVISIONS

ATTACHMENT 15
MISCELLANEOUS PROVISIONS
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Attachment 15
MISCELLANEOUS PROVISIONS

PROTECTION AND SAFETY

The Contractor shall take all necessary precautions to insure that no damages to private or public property will result from his operations. Any such damages shall be repaired or replaced by the Contractor in accordance with the SECTION I: CONTRACT CLAUSES entitled "PERMITS AND RESPONSIBILITIES" and "PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS", without delay, and at no cost to the Government.

a. Protection of Grassed and Landscaped Areas: Contractor vehicles shall be restricted to paved roadways and driveways. Vehicles shall not be driven or parked on grassed and/or landscaped areas except when absolutely necessary for the performance of the work and approved in advance by the Contracting Officer. Grassed or landscaped areas damaged by the Contractor shall be restored to their original condition without delay and at no cost to the Government.

b. Restoration Work: Existing conditions or areas damaged or disturbed by the Contractor's operations shall be restored to their original condition, or to near original condition as possible, to the satisfaction of the Contracting Officer.

c. Warning Signs and Barricades: The Contractor shall be responsible for posting warning signs or erecting temporary barricades to provide for safe conduct of work and protection of property. The Contractor shall also be responsible for covering, securing, and providing physical barricades to open excavations for safety purposes.

d. Rubbish and Debris: At the end of each working day, the work area shall be maintained free of loose debris and debris that may attract children. Debris stored at the job site shall be placed in dumpsters or other closed containers to prevent distribution by wind.

PROTECTION OF ENVIRONMENTAL RESOURCES

a. The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The Contractor shall confine his activities to areas defined by the drawings and specifications. Environmental protection shall be as stated in the following subparagraphs.

(1) Protection of Land Resources. Prior to the beginning of any construction, the Contractor shall identify all land resources to be preserved

within the Contractor's work area. Except in areas specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without special permission from the Contracting Officer.

The contractor is notified that under and immediately around existing buildings, there is a potential for residual amounts of insecticides and rodenticides. In accordance to 40 CFR 261.1 (c), the commercial application of insecticides, if applied on the land for its ordinary and intended purposes, does not constitute hazardous solid waste. Recognizing that the existing construction practices and final disposition of soil may result in human contact with residual insecticides and rodenticides, the following practices shall be accomplished:

(a) Dust control measures shall be enforced throughout areas of demolition activity (Schofield Barracks, Areas "I" and "J"). A 4.6 m (15 foot) high minimum dust/environmental screen barrier shall be provided where construction activity occurs adjacent to occupied housing and other activities and facilities. Dust barriers shall be equipped with posts and bracing to maintain the barrier in a plumb position. Barrier fabric shall be of sufficient strength to resist wear and tear for the duration of the construction activity. Dust barriers shall be approved by the Contracting Officer.

(b) For any trenching work which is required under or within 10 feet of former building sites, the excavated material shall be redeposited into the original trench as nearly as practicable.

(c) Stockpiling of top-soil shall be avoided. Any excess material derived from the first one foot of surface under or within 10 feet of existing buildings shall be placed, graded, and a minimum of 4 inches of clean imported topsoil shall be deposited. Material which cannot be utilized effectively in grading shall be disposed in usual disposal sites.

(d) In areas formerly occupied by buildings, and which will remain as landscaped areas 4 inches of imported clean topsoil shall be deposited prior to completion of landscaping work.

(2) Disposal of Solid Wastes. Solid wastes (excluding clearing debris) shall be placed in containers which are emptied daily. All handling and disposal shall be conducted to prevent contamination. Dwelling units to be demolished under this contract may contain asbestos materials and lead based paint on substrate. All friable and non-friable asbestos material, such as transite paneling defined in the survey data must be removed prior to general demolition and disposed of in accordance with Federal and State regulatory requirements. LCP on substrate will be disposed thereof accordingly. Refer also to requirements in demolition section of the Statement of Work. Worker respiratory protection and air monitoring pursuant to OSHA 29 CFR 1910.134 Respiratory Monitoring Protection Program for ACM and LCP will be required. The Contractor shall engage the services of a certified Industrial Hygienist (CIH) who is certified as an AHERA contractor/supervisor to direct and be responsible for these activities. The CIH shall prepare an asbestos and lead

paint work plan that shall provide items such as personal monitoring, area monitoring, work tasks and personnel protection related to abatement of asbestos prior to building demolition and protection from lead paint exposure during demolition. The plan shall indicate work practices and engineering controls to reduce contamination beyond the work area to below the action level for lead and permissible exposure level for asbestos. All submittals shall be signed by the CIH. Monitoring results shall be provided to the Contracting Officer within three calendar days of their collection. The monitoring results shall provided all information provided in record keeping sections of 29 CFR 1926.61 (exposure assessment) and 29 CFR 1926.1101 (exposure measurements).

The survey data, Asbestos Survey of Real Property Facilities and Asbestos and Lead Survey Family Housing Areas, are available for review at the Programs & Project Management Division, CEPOH-PP-P, Building 230, Room 318.

(3) Disposal of Chemical Waste. Chemical waste shall be stored in corrosion resistant containers, removed from the work area and disposed of in accordance with Federal, State, and local laws and regulations.

(4) Preservation and Recovery of Historical, Archeological, and Cultural Resources. Existing historical, archeological, and cultural resources within the Contractor's work area will be so designated by the Contracting Officer if any has been identified. The Contractor shall take precautions to preserve all such resources as they existed at the time they were pointed out to him. The Contractor shall provide and install all protection for these resources so designated and shall be responsible for their preservation during this contract. If during excavation or other construction activities in areas with existing or known resources, as well as in any other work area, any previously unidentified or unanticipated resources are discovered or found, all activities that may damage or alter such resources shall be temporarily suspended. These resources or cultural remains (prehistoric or historic surface or subsurface) include but are not limited to: any human skeletal remains or burials; artifacts; shell, midden, bone, charcoal, or other deposits; rocks or coral alignments, pavings, wall, or other constructed features; and any indication of agricultural or other uses. Upon such discovery or find, the Contractor shall immediately notify the Contracting Officer. When so notified, the Contracting Officer will initiate action so that prompt and proper data recovery can be accomplished. In the mean time, recording and preservation of historical and archeological finds during construction activities shall be reported.

(5) Protection of Water Resources.

(a) The Contractor shall keep construction activities under surveillance, management and control to avoid pollution of surface and ground waters. In particular, toxic or hazardous chemicals shall not be applied to soil or vegetation in a manner that may cause contamination of the fresh water reserve. Monitoring of water areas affected by construction activities shall be the responsibility of the Contractor. All water areas affected by construction activities shall be monitored by the Contractor.

(b) The Contractor shall prepare, coordinate and submit applicable "Notification of Intent" (NOI) including all applicable Best Management Practice plans for coverage of this project under the following State of Hawaii general permits under the NPDES (National Pollutant Discharge Elimination System) where Contractor operations and the project will result in water discharge to State of Hawaii waters: storm water - construction; hydrotesting waters (to include disinfection water); and construction dewatering. Separate NOI submissions are required for the different general permits, and as may be required by the State of Hawaii due to activities at different sites/installations or due to different Military Services control (Army, Navy, Air Force, etc). The Contractor shall prepare and submit all documents and supporting data/analyses/sketches/ drawings required for the NOI's to the Contracting Officer for review and signature by the appropriate Government official. NOI submissions shall indicate future housing projects that are adjacent to this project. The Government has submitted to the State of Hawaii Department of Health the Part I, or basic Notice of Intent application for only the Storm Water-Construction requirements. The Contractor will be required, following award and during the design process to complete the qualitative and a quantitative data requirements, including providing a description of the storm water pollution control plan and monitoring. Contractor shall when directed by the Contracting Officer submit by letter signed NOI documents to the appropriate State of Hawaii Office. The Contracting Officer will provide the Contractor a signed document authorizing the Contractor to submit the same on behalf of the Government as required permits when received directly from the State of Hawaii shall be forwarded to the Contracting Officer and a copy of the same maintained at the Contractor's project field Office. The Contractor shall comply with all supplemental submittal requirements as called for by the Contracting Officer. The Contractor shall schedule, prepare, coordinate and submit required NOI's so that project site work will not be delayed. The Government period for signature of the NOI's and submissions to the State or return to the Contractor for His submission of the State of Hawaii shall be 30 calendar days. The State of Hawaii requirement is submission 90 days prior to start of the applicable construction activity.

(6) Protection of Fish and Wildlife Resources. The Contractor shall keep construction activities under surveillance, management and control to minimize interference with, disturbance to, and damage of fish and wildlife. Species that require specific attention, along with measures for their protection, will be listed by the Contractor prior to the beginning of construction operations. An Environmental Assessment has been prepared for this area of construction. A copy of it can be obtained from the USACE by calling (808) 438-7038.

(7) Protection of Air Resources. The Contractor shall keep construction activities under surveillance, management, and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the Contractor in accomplishing the specified construction shall be in strict accordance with the State of Hawaii Department of Health Administrative Rules, Chapter 59, "Ambient Air Quality Standards", and Chapter 60, "Air Pollution Control", and all Federal emission and performance laws and standards. Monitoring of air quality shall be the

responsibility of the Contractor. All air areas affected by the construction activities shall be monitored by the Contractor.

(8) Protection From Sound Intrusions. The Contractor shall keep construction activities under surveillance and control to minimize damage to the environment by noise. The Contractor shall comply with the provisions of the State of Hawaii Department of Health Administrative Rules, Title 11, Chapter 43, "Community Noise Control for Oahu".

b. The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the aforementioned Federal, State or local laws or regulations, permits, and other elements of the Contractor's environmental protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action as may be approved. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions shall be granted or costs or damages allowed to the Contractor for any such suspension.

c. The Contractor shall submit an environmental protection plan to the Contracting Officer for approval. Approval of the environmental protection plan will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures. The environmental protection plan shall include but not be limited to the following:

(1) A List of Federal, State and Local Laws, Regulations, and Permits concerning environmental protection, pollution control, and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.

(2) Methods for Protection of Features to be preserved within authorized work areas. The Contractor shall prepare a listing of methods to protect resources needing protection; i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, archeological, and cultural resources.

(3) Procedures to be Implemented to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures set out in accordance with the environmental protection plan.

(4) Location of the solid waste disposal area.

(5) Drawings Showing Locations of any proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.

(6) Environmental Monitoring Plans for the job site, including land, water, air, and noise monitoring.

(7) Methods of Protecting surface and ground water during construction activities. De-watering plan shall be submitted as sites require.

(8) Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas.

(9) Plans showing the method of protection and placement of such protection to protect occupants of Solomon Elementary School from dust and noise related to construction activities in Area U.

(10) Training for his personnel during the construction period. Training shall not only include that related to predemolition removal of asbestos and protection of lead dust during demolition, but shall also include hazard awareness training for all workers who may work in areas where these hazards may exist but whose work is not directly related to them.

(11) The Contractor shall include as part of the environmental protection plan all applicable "Notification of Intent" providing project coverage under the State of Hawaii NPDES storm water general permits for construction activities (construction, construction dewatering, hydrotesting waters) as required by this contract under "Permits And Responsibilities" of the Special Clauses. All submissions and State of Hawaii responses and approvals shall be included. The Plan shall be updated as necessary and revisions or the updated plan submitted as directed by the Contracting Officer's Representative.

STAKING AND FLAGGING EXISTING UTILITIES

The Contractor, prior to the start of any excavation or trenching work, shall verify the location of all utility lines shown on the Request for Proposals (RFP) drawings which are within the areas of work, and shall mark, stake, or flag each utility line along trench alignments and under areas of excavation under this project, as approved. Existing utility lines shall be located by walking trench alignments with calibrated toning equipment for locating underground pipes and cables. Any additional utility lines or cables discovered during the walking of the trench alignments or excavations shall be marked, staked or flagged as above. Prior to start of any excavation or trenching work, the Contractor shall obtain clearance, in writing, from the appropriate communications agency and base or area engineer. Copies of all correspondence shall be provided to the Contracting Officer (for information only). Normal coordination time for obtaining the necessary permits is approximately 15 calendar days. The Contractor shall advise the Contracting Officer promptly when it appears that the normal coordination time will be exceeded.

GOVERNMENT PROJECT OFFICE

Schofield Barracks: The Contractor shall provide, for use by Government supervisory and inspection personnel, a job-site office space at Schofield Barracks with a floor area not less than 300 square feet based upon a 10-foot width. This office space may be within the Contractor's project office building if adjacent to the job site and if separated by a solid partition; otherwise a separate facility, adjacent to the job site, shall be provided with windows and screens, electricity (including a minimum of four (4) wall outlets and two (2) ceiling lights), two (2) telephones with separate lines, two (2) desks with drawers, one (1) 3-foot by 7-foot layout table, two (2) chairs, two (2) legal and two (2) letter size four-drawer locking file cabinets, two (2) plan holding racks, air conditioning, and a fire extinguisher. Potable drinking water and temporary toilet facilities shall be made available to Government personnel, not necessarily within the project office, but in close proximity thereof. The cost of utilities including telephone, and operation and maintenance costs of the Government project office shall be borne by the Contractor. The Government will be responsible for its long-distance calls. Upon completion of the project, the project office and furnishings shall be removed and disposed of by the Contractor.

PRECONSTRUCTION CONFERENCE

The Contractor shall meet with the Contracting Officer within thirty (30) days after design approvals or as determined by the Contracting Officer to discuss design and construction schedules, and to resolve any procedural questions affecting the administration of the contract. The Contractor shall bring a proposed construction schedule to this meeting. If significant design issues are surfaced, the meeting may be reconvened at POD by the Contracting Officer. The Contractor shall designate his representatives and the limits of their authority. At the completion of this conference, the Contractor shall reduce to writing any questions pertaining to the Contractor and/or mutual understandings as a result of the conference and shall submit the documentation to the Contracting Officer, the general intent being that both parties will be fully apprised of all factors affecting the contract. The Contractor shall also be responsible for taking minutes of the meeting and attaching them to the documentation.

OPERATION OR STORAGE AREA

An open operation or storage area at an exact location to be determined by the Government will be available. The Contractor shall be responsible for the security necessary for protection of his equipment and materials and shall maintain the area free of debris. No rusty or unsightly materials shall be used for providing the secure measure and such measure shall be erected in a worklike manner. Upon completion and prior to the final acceptance of the contract work, the Contractor shall restore the area to its original condition. Covered storage will not be provided to the contractor by the Government. The construction/storage area security fence shall have sign on each entrance with the following information:

Contractor's or Government Agency:
Telephone number (In an emergency):

a. Schofield Barracks: The Contractor's operation and storage area(s) shall be located as shown on Attachment 9, New Construction Site Plan, the drawings or as designated by the Contracting Officer. Contractor shall maintain the area. Grass and weeds in the operations and storage areas and at the fence lines of the project site, as well as storage sites, will be cut and maintained to provide a neat appearance.

WORKING HOURS

All work shall be performed between the hours of 0730 to 1600 HST, Monday through Friday. No work shall be accomplished on Saturdays, Sundays, and the following holidays: New Year's Day, Dr. Martin Luther King Jr.'s Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Discoverers' Day, Veterans' Day, Thanksgiving Day and during the period between and including 24 December and 2 January, without written permission from the Contracting Officer; such written permission shall be maintained at the job site at all times during which it is required.

SUBMISSION OF STATEMENT BY PRIME CONTRACTOR FOR SUBCONTRACT WORK AFTER AWARD.

The form submittal listed under LIST OF ATTACHMENTS, will be used after award in conjunction with CONTRACT CLAUSES, Contract Clause Number 29. DFARS 252/219-7003 - Small Business and Small Disadvantaged Business Subcontracting Plan (DOD Contracts).

DPW - UTILITY RATES FOR PROJECTS

The fees for utility use by contractors shall be as follows:

- (1) Elec Rate - \$0.11180/KWH
- (2) Water Rate - \$2.32 per 1,000 gallons
- (3) Sewer Rate - \$4.74 per 1,000 gallons

VEHICLE PARKING FOR CONTRACTOR AND EMPLOYEES

Parking within I, J, and K area is limited. Parking for vehicles owned by the contractor, subcontractor(s) and employees will be limited to within the project limits.

END OF SECTION

ATTACHMENT 16
GENERAL REQUIREMENTS

<u>SECTION</u>	<u>TITLE</u>
01320	PROJECT SCHEDULE
01330	SUBMITTAL PROCEDURES
01415	METRIC MEASUREMENTS
01451	CONTRACTOR QUALITY CONTROL
01780	CLOSEOUT SUBMITTALS

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- 1.2 QUALIFICATIONS

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-- End of Section Table of Contents --

SECTION 01320
PROJECT SCHEDULE

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-07 Schedules

Preliminary Project Schedule; GA.
Initial Project Schedule; GA.
Periodic Schedule Updates; GA.

Two copies of the schedules showing codes, values, categories, numbers, items, etc., as required.

SD-08 Statements

Qualifications; GA.

Documentation showing qualifications of personnel preparing schedule reports.

SD-09 Reports

Narrative Report; FIO.
Schedule Reports; FIO.

Two copies of the reports showing numbers, descriptions, dates, float, starts, finishes, durations, sequences, etc., as required.

1.2 QUALIFICATIONS

The Contractor shall designate an authorized representative who shall be responsible for the preparation of all required project schedule reports. This person shall have previously created and reviewed computerized schedules. Qualifications of this individual shall be submitted to the Contracting Officer for review with the Preliminary Project Schedule submission

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS, a Project Schedule as described below shall be prepared. The scheduling of construction shall be the responsibility of the Contractor. Contractor

management personnel shall actively participate in its development. Subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule. The approved Project Schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments.

3.2 BASIS FOR PAYMENT

Lack of an approved schedule or scheduling personnel shall result in an inability of the Contracting Officer to evaluate Contractor progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. In the case where Project Schedule revisions have been directed by the Contracting Officer and those revisions have not been included in the Project Schedule, then the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until revisions to the Project Schedule have been made.

3.3 PROJECT SCHEDULE

The computer software system utilized by the Contractor to produce the Project Schedule shall be capable of providing all requirements of this specification. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule. Manual methods used to produce any required information shall require approval by the Contracting Officer.

3.3.1 Use of the Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in either the Precedence Diagram Method (PDM) or the Arrow Diagram Method (ADM).

3.3.2 Level of Detail Required

With the exception of the preliminary schedule submission, the Project Schedule shall include an appropriate level of detail. Failure to develop or update the Project Schedule or provide data to the Contracting Officer at the appropriate level of detail, as specified by the Contracting Officer, shall result in the disapproval of the schedule. The Contracting Officer will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the Project Schedule.

3.3.2.1 Activity Durations

Contractor submissions shall follow the direction of the Contracting Officer regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods (usually less than 2 percent of all non-procurement activities' Original Durations shall be greater than 20 days).

3.3.2.2 Procurement Activities

Tasks related to the procurement of long lead materials or equipment shall

be included as separate activities in the project schedule. Long lead materials and equipment are those materials that have a procurement cycle of over 90 days. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing.

3.3.2.3 Government Activities

Government and other agency activities that could impact progress shall be shown. These activities include, but are not limited to: approvals, inspections, utility tie-in, Government Furnished Equipment (GFE) and notice to proceed for phasing requirements.

3.3.2.4 Bid Item

All activities shall be identified in the project schedule by the Bid Item to which the activity belongs. An activity shall not contain work in more than one bid item. The bid item for each appropriate activity shall be identified by the Bid Item Code.

3.3.2.5 Feature of Work

All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to a work breakdown structure for the project. The feature of work for each activity shall be identified by the Feature of Work Code.

3.3.3 Scheduled Project Completion

The schedule interval shall extend from notice-to-proceed to the contract completion date.

3.3.3.1 Project Start Date

The schedule shall start no earlier than the date that the Notice to Proceed (NTP) was acknowledged. The Contractor shall include as the first activity in the project schedule an activity called "Start Project". The "Start Project" activity shall have: a "ES" constraint, a constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

3.3.3.2 Constraint of Last Activity

Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have: a "LF" constraint, a constraint date equal to the completion date for the project, and a zero day duration.

3.3.3.3 Early Project Completion

In the event the project schedule shows completion of the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. Contractor shall specifically address each of the activities noted at every project schedule update period to assist the Contracting Officer in

evaluating the Contractor's ability to actually complete prior to the contract period.

3.3.4 Interim Completion Dates

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date.

3.3.5 Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual Start and Finish dates on the CPM schedule shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control report for every in-progress or completed activity and ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes.

3.3.6 Out-of-Sequence Progress

Activities that have posted progress without predecessors being completed (Out-of-Sequence Progress) will be allowed only on a case-by-case approval of the Contracting Officer. The Contracting Officer may direct that changes in schedule logic be made to correct any or all out-of-sequence work.

3.3.7 Extended Non-Work Periods

Designation of Holidays to account for non-work periods of over 5 days will not be allowed. Non-work periods of over 5 days shall be identified by addition of activities that represent the delays. Modifications to the logic of the project schedule shall be made to link those activities that may have been impacted by the delays to the newly added delay activities.

3.3.8 Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data disk, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

3.4.1 Preliminary Project Schedule Submission

The Preliminary Project Schedule, defining the Contractor's planned operations for the first 90 calendar days shall be submitted for approval within 20 calendar days after Notice to Proceed is acknowledged. The approved preliminary schedule shall be used for payment purposes not to exceed 90 calendar days after Notice to Proceed.

3.4.2 Initial Project Schedule Submission

The Initial Project Schedule shall be submitted for approval within 60 calendar days after Notice to Proceed. The schedule shall provide a reasonable sequence of activities which represent work through the entire project and shall be at a reasonable level of detail.

3.4.3 Periodic Schedule Updates

Based on the result of progress meetings, specified in "Periodic Progress Meetings," the Contractor shall submit periodic schedule updates. These submissions shall enable the Contracting Officer or to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgement of the Contracting Officer or authorized representative, is necessary for verifying the contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the initial submission, and every periodic project schedule update throughout the life of the project:

3.5.1 Data Disks

One data disk or one set of data disks containing the project schedule shall be provided. Data on the disks shall be in the P3 format or other format which conforms to the format specified in the attached Standard Data Exchange Format specification (attached at the end of this Project Schedule specification).

3.5.1.1 File Medium

Required data shall be submitted on 3.5-inch disks, formatted to hold 1.44 MB of data, under the MS-Windows operating system.

3.5.1.2 Disk Label

A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (Initial, Update, or Change), full contract number, project name, project location, data date, name and telephone number or person responsible for the schedule, and the operating system and version used to format the disk.

3.5.1.3 File Name

Each file submitted shall have a name related to either the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will ensure that the names of the files submitted are unique. The Contractor shall submit the file naming convention to the Contracting Officer for approval.

3.5.2 Narrative Report

A Narrative Report shall be provided with each update of the project schedule. This report shall be provided as the basis of the Contractor's progress payment request. The Narrative Report shall include: a description of activities along the critical path(s), a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken.

3.5.3 Approved Changes Verification

Only project schedule changes that have been previously approved by the Contracting Officer shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, approved schedule changes.

3.5.4 Schedule Reports

The format for each activity for the schedule reports listed below shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float. Actual Start and Actual Finish Dates shall be printed for those activities in progress or completed.

3.5.4.1 Activity Report

A list of all activities sorted according to activity number or "I-NODE" AND "J-NODE" and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be used as the secondary sort.

3.5.4.2 Logic Report

A list of Preceding and Succeeding activities for every activity in ascending order by activity number and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be used as the secondary sort.

3.5.4.3 Total Float Report

A list of all activities sorted in ascending order of total float. Activities which have the same amount of total float shall be listed in ascending order of Early Start Dates.

3.5.4.4 Earnings Report

A compilation of the Contractor's Total Earnings on the project from the Notice to Proceed until the most recent Monthly Progress Meeting. This report shall reflect the Earnings of specific activities based on the agreements made in the field and approved between the Contractor and Contracting Officer at the most recent Monthly Progress Meeting. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining Contractor Payment. Activities shall be grouped by bid item and sorted by activity numbers. This report shall: sum all activities in a bid item and provide a bid item percent; and complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: Activity Number or "i-node" and "j-node", Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), Earnings to Date.

3.5.5 Network Diagram

The network diagram shall be required on the initial schedule submission and on monthly schedule update submissions. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The activity or event

number, description, duration, and estimated earned value shall be shown on the diagram. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left.

3.5.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.5.3 Critical Path

The critical path shall be clearly shown.

3.5.5.4 Banding

Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by category of work, work area and/or responsibility.

3.5.5.5 S-Curves

Earnings curves showing projected early and late earnings and earnings to date.

3.6 PERIODIC PROGRESS MEETINGS

Progress meetings to discuss payment shall include a monthly onsite meeting or other regular intervals mutually agreed to at the preconstruction conference. During this meeting the Contractor shall describe, on an activity by activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project. The Contracting Officer will approve activity progress, proposed revisions, and adjustments as appropriate.

3.6.1 Meeting Attendance

The Contractor's Project Manager and Scheduler shall attend the regular progress meeting.

3.6.2 Update Submission Following Progress Meeting

A complete update of the project schedule containing all approved progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after the monthly progress meeting.

3.6.3 Progress Meeting Contents

Update information, including Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost-to-Date shall be subject to the approval of the Contracting Officer. The following is a minimum set of items which the Contractor shall address, on an activity by activity basis, during each progress meeting.

3.6.3.1 Start and Finish Dates

The Actual Start and Actual Finish dates for each activity currently in-progress or completed activities.

3.6.3.2 Time Completion

The estimated Remaining Duration for each activity in-progress. Time-based progress calculations must be based on Remaining Duration for each activity.

3.6.3.3 Cost Completion

The earnings for each activity started. Payment will be based on earnings for each in-progress or completed activity. Payment for individual activities will not be made for work that contains quality defects. A portion of the overall project amount may be retained based on delays of activities.

3.6.3.4 Logic Changes

All logic changes pertaining to Notice to Proceed on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

3.6.3.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary, and 3) a schedule which does not represent the actual prosecution and progress of the work.

3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the contract completion date, he shall furnish such justification, project schedule data and supporting evidence as the Contracting Officer may deem necessary for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof of delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is obligatory to any approvals.

3.7.1 Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request.

The Contracting Officer's determination as to the number of allowable days of contract extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, will not be a cause for a time extension to the contract completion date.

3.7.2 Submission Requirements

The Contractor shall submit a justification for each request for a change

in the contract completion date of under 2 weeks based upon the most recent schedule update at the time of the Notice to Proceed or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

- a. A list of affected activities, with their associated project schedule activity number.
- b. A brief explanation of the causes of the change.
- c. An analysis of the overall impact of the changes proposed.
- d. A sub-network of the affected area.

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

3.7.3 Additional Submission Requirements

For any requested time extension of over 2 weeks, the Contracting Officer may request an interim update with revised activities for a specific change request. The Contractor shall provide this disk within 4 days of the Contracting Officer's request.

3.8 DIRECTED CHANGES

If Notice to Proceed (NTP) is issued for changes prior to settlement of price and/or time, the Contractor shall submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The proposed revisions to the schedule will be approved by the Contracting Officer prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

3.9 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

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SECTION 01330

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SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUBMITTAL IDENTIFICATION

Submittals required are identified by SD numbers as follows:

SD-07 Schedules

SD-08 Statements

SD-09 Reports

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved

Governmental approval is required for extensions of design, critical materials, deviations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction," they are considered to be "shop drawings."

1.2.2 Information Only

All submittals not requiring Government approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above.

1.3 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the CQC requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.4 DISAPPROVED SUBMITTALS

The Contractor shall make all corrections required by the Contracting Officer and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. If the Contractor considers any correction indicated on the submittals to constitute a change to the contract, a notice in accordance with the Contract Clause "Changes" shall be given promptly to the Contracting Officer.

1.5 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) representative and each item shall be stamped, signed, and dated by the CQC representative indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

At the end of this section is one set of ENG Form 4288 listing items of equipment and materials for which submittals are required by the specifications; this list may not be all inclusive and additional submittals may be required. The Contractor will also be given the submittal register as a diskette containing the computerized ENG Form 4288 and instructions on the use of the diskette. Columns "d" through "r" have been completed by the Government; the Contractor shall complete columns "a" and "s" through "u" and submit the forms (hard copy plus associated electronic file) to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. The Contractor shall keep this diskette up-to-date and shall submit it to the Government together with the monthly payment request. The approved submittal register will become the scheduling document and will be used to control submittals throughout the life of the contract. The submittal register and the progress schedules shall be coordinated.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for

review and approval. No delay damages or time extensions will be allowed for time lost in late submittals. An additional 15 calendar days shall be allowed and shown on the register for review and approval of submittals for food service equipment and refrigeration and HVAC control systems.

3.4 TRANSMITTAL FORM (ENG FORM 4025)

The sample transmittal form (ENG Form 4025) attached to this section shall be used for submitting both Government approved and information only submittals in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURE

Submittals shall be made as follows:

3.5.1 Procedures

Submittals to the Contracting Officer are required in the number of copies identified in paragraphs 3.7 and 3.8 and shall be submitted to:

U.S. Army Corps of Engineer District, Honolulu
Schofield Barracks]Resident Office
Bldg 230
Fort Shafter, Hawaii 96858-5440

3.5.2 Deviations

For submittals which include proposed deviations requested by the Contractor, the column "variation" of ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

3.6 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

3.7 GOVERNMENT APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. 3 copies of the submittal will be retained by the Contracting Officer and 1 copy of the submittal will be returned to the Contractor.

3.8 INFORMATION ONLY SUBMITTALS

Submittals provided For Information Only (FIO) to the Government shall be submitted in three (3) copies, including resubmittals. Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government

reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

3.9 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR	
(Firm Name)	
_____	Approved
_____	Approved with corrections as noted on submittal data and/or attached sheets(s).
SIGNATURE: _____	
TITLE: _____	
DATE: _____	

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SECTION 01415

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[illegible]

INSTRUCTIONS

1. Section I will be initiated by the Contractor in the required number of copies.
2. Each transmittal shall be numbered consecutively in the space provided for "Transmittal No.". This number, in addition to the contract number, will form a serial number for identifying each submittal. For new submittals or resubmittals mark the appropriate box; on resubmittals, insert transmittal number of last submission as well as the new submittal number.
3. The "Item No." will be the same "Item No." as indicated on ENG FORM 4288-R for each entry on this form.
4. Submittals requiring expeditious handling will be submitted on a separate form.
5. Separate transmittal form will be used for submittals under separate sections of the specifications.
6. A check shall be placed in the "Variation" column when a submittal is not in accordance with the plans and specifications--also, a written statement to that effect shall be included in the space provided for "Remarks".
7. Form is self-transmittal, letter of transmittal is not required.
8. When a sample of material or Manufacturer's Certificate of Compliance is transmitted, indicate "Sample" or "Certificate" in column c, Section I.
9. U.S. Army Corps of Engineers approving authority will assign action codes as indicated below in space provided in Section I, column i to each item submitted. In addition they will ensure enclosures are indicated and attached to the form prior to return to the contractor. The Contractor will assign action codes as indicated below in Section I, column g, to each item submitted.

THE FOLLOWING ACTION CODES ARE GIVEN TO ITEMS SUBMITTED

A	Approved as submitted.	E	Disapproved (See attached).
B	Approved, except as noted on drawings.	F	Receipt acknowledged.
C	Approved, except as noted on drawings. Refer to attached sheet resubmission required.	FX	Receipt acknowledged, does not comply as noted with contract requirements.
D	Will be returned by separate correspondence.	G	Other (Specify)

10. Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.

(Reverse of ENG Form 4025-R)

SECTION 01415

METRIC MEASUREMENTS

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM E 380	(1993) Practice for Use of the International System of Units (SI)
ASTM E 621	(1994) Practice for Use of Metric (SI) Units in Building Design and Construction

1.2 GENERAL

This project includes metric units of measurements. The metric units used are the International System of Units (SI) developed and maintained by the General Conference on Weights and Measures (CGPM); the name International System of Units and the international abbreviation SI were adopted by the 11th CGPM in 1960. A number of circumstances require that both metric SI units and English inch-pound (I-P) units be included in a section of the specifications. When both metric and I-P measurements are included, the section may contain measurements for products that are manufactured to I-P dimensions and then expressed in mathematically converted metric value (soft metric) or, it may contain measurements for products that are manufactured to an industry recognized rounded metric (hard metric) dimensions but are allowed to be substituted by I-P products to comply with the law. Dual measurements are also included to indicate industry and/or Government standards, test values or other controlling factors, such as the code requirements where I-P values are needed for clarity or to trace back to the referenced standards, test values or codes.

1.3 USE OF MEASUREMENTS

Measurements shall be either in SI or I-P units as indicated, except for soft metric measurements or as otherwise authorized. When only SI or I-P measurements are specified for a product, the product shall be procured in the specified units (SI or I-P) unless otherwise authorized by the Contracting Officer. The Contractor shall be responsible for all associated labor and materials when authorized to substitute one system of units for another and for the final assembly and performance of the specified work and/or products.

1.3.1 Hard Metric

A hard metric measurement is indicated by an SI value with no expressed correlation to an I-P value, i.e., where an SI value is not an exact mathematical conversion of an I-P value, such as the use of 100 mm in lieu of 4 inches. Hard metric measurements are often used for field data such as distance from one point to another or distance above the floor.

Products are considered to be hard metric when they are manufactured to metric dimensions or have an industry recognized metric designation.

1.3.2 Soft Metric

- a. A soft metric measurement is indicated by an SI value which is a mathematical conversion of the I-P value shown in parentheses (e.g. 38.1 mm (1-1/2 inches)). Soft metric measurements are used for measurements pertaining to products, test values, and other situations where the I-P units are the standard for manufacture, verification, or other controlling factor. The I-P value shall govern while the metric measurement is provided for information.
- b. A soft metric measurement is also indicated for products that are manufactured in industry designated metric dimensions but are required by law to allow substitute I-P products. These measurements are indicated by a manufacturing hard metric product dimension followed by the substitute I-P equivalent value in parentheses (e.g., 190 x 190 x 390 mm (7-5/8 x 7-5/8 x 15-5/8 inches)).

1.3.3 Neutral

A neutral measurement is indicated by an identifier which has no expressed relation to either an SI or an I-P value (e.g., American Wire Gage (AWG) which indicates thickness but in itself is neither SI nor I-P).

1.4 COORDINATION

Discrepancies, such as mismatches or product unavailability, arising from use of both metric and non-metric measurements and discrepancies between the measurements in the specifications and the measurements in the drawings shall be brought to the attention of the Contracting Officer for resolution.

1.5 RELATIONSHIP TO SUBMITTALS

Submittals for Government approval or for information only shall cover the SI or I-P products actually being furnished for the project. The Contractor shall submit the required drawings and calculations in the same units used in the contract documents describing the product or requirement unless otherwise instructed or approved. The Contractor shall use ASTM E 380 and ASTM E 621 as the basis for establishing metric measurements required to be used in submittals.

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SECTION 01451

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740 (1996) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

ASTM E 329 (1995b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled "Inspection of Construction." The quality control system shall consist of plans, procedures, and organization necessary to produce an end product which complies with the contract requirements. The system shall cover all construction operations, both onsite and offsite, and shall be keyed to the proposed construction sequence. The project superintendent will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract. The project superintendent in this context shall mean the individual with the responsibility for the overall management of the project including quality and production.

3.2 QUALITY CONTROL PLAN

3.2.1 General

The Contractor shall furnish for review by the Government, not later than

30 days after receipt of notice to proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan for the first 90 days of operation. Construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all construction operations, both onsite and offsite, including work by subcontractors, fabricators, suppliers, and purchasing agents:

- a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the work specified. The staff shall include a CQC System Manager who shall report to the project superintendent.
- b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. Technicians responsible for sampling and testing of concrete shall be certified by the American Concrete Institute (ACI) or the Concrete Technicians Association of Hawaii (CTAH). Proof of certification shall be included in the CQC Plan. Personnel qualifications may be furnished incrementally as the work progresses, but in no case, less than fourteen (14) calendar days before personnel are required on the job.
- c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.
- d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330 SUBMITTAL PROCEDURES.
- e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test.
- f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.
- g. Procedures for tracking construction deficiencies from

identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

- h. Reporting procedures, including proposed reporting formats.
- i. A list of the definable features of work. A definable feature of work is a task which is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. This list will be agreed upon during the coordination meeting.

3.2.3 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.4 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing of any proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

3.3 COORDINATION MEETING

After the Preconstruction Conference, before start of construction, and prior to acceptance by the Government of the CQC Plan, the Contractor shall meet with the Contracting Officer or Authorized Representative and discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 7 calendar days prior to the Coordination Meeting. During the meeting, a mutual understanding of the system details shall be developed, including the forms for recording the CQC operations, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting shall be prepared by the Government and signed by both the Contractor and the Contracting Officer. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures which may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 General

The requirements for the CQC organization are a CQC System Manager and sufficient number of additional qualified personnel to ensure contract compliance. The Contractor shall provide a CQC organization which shall be at the site at all times during progress of the work and with complete authority to take any action necessary to ensure compliance with the

contract. All CQC staff members shall be subject to acceptance by the Contracting Officer.

3.4.2 CQC System Manager

[The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of 5 years in related work. This CQC System manager shall be on the site at all time during construction and shall be employed by the prime Contractor. The CQC System Manger shall be assigned no other duties. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as the designated CQC System Manager.]

[The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a construction person with a minimum of 5 years in related work. This CQC System Manager shall be on the site at all times during construction and shall be employed by the prime Contractor. The CQC System Manager shall be assigned as System Manager, but may have duties as project superintendent in addition to quality control. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirement for the alternate shall be the same as for the designated CQC Systems Manager.]

3.4.3 CQC Personnel

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager. If it is subsequently determined by the Contracting Officer that the minimum contract CQC requirements are not being met, the Contractor may be required to provide additional staff personnel to the CQC organization at no cost to the Government.

3.4.4 Additional Requirement

The CQC System Manager shall have completed the course entitled "Construction Quality Management For Contractors". This course is periodically offered at the General Contractors Association of Hawaii.

3.4.5 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

3.5 SUBMITTALS

Submittals shall be made as specified in Section 01330 SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. At least three phases of control shall be conducted by the CQC System Manager for each definable feature of work as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

- a. A review of each paragraph of applicable specifications.
- b. A review of the contract drawings.
- c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.
- d. Review of provisions that have been made to provide required control inspection and testing.
- e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.
- f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.
- g. A review of the appropriate activity hazard analysis to assure safety requirements are met.
- h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.
- i. A check to ensure that the portion of the plan for the work to be performed has been accepted by the Contracting Officer.
- j. Discussion of the initial control phase.
- k. The Government shall be notified at least 48 hours in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of

work. The following shall be accomplished:

- a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.
- b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.
- c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.
- d. Resolve all differences.
- e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.
- f. The Government shall be notified at least 24 hours in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.
- g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work which may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if the quality of on-going work is unacceptable, if there are changes in the applicable CQC staff, onsite production supervision or work crew, if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product which conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall obtain the services of an industry recognized testing laboratory, or may establish a testing laboratory at the

project site acceptable to the Contracting Officer. However, tests contractually required to be performed by an industry recognized testing laboratory shall not be accomplished by the Contractor established on-site laboratory. The Contractor shall perform the following activities and record and provide the following data:

- a. Verify that testing procedures comply with contract requirements.
- b. Verify that facilities and testing equipment are available and comply with testing standards.
- c. Check test instrument calibration data against certified standards.
- d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
- e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Laboratory Accreditation

The testing laboratory performing the actual testing on the project shall be accredited by one of the following laboratory accreditation authorities:

American Association of State Highway and Transportation Officials
 National Voluntary Laboratory Accreditation Program
 American Association for Laboratory Accreditation
 Washington Association of Building Officials

The testing laboratory shall submit an acknowledgement letter from one of the listed laboratory accreditation authorities indicating that the application for accreditation has been received and the accreditation process started.

3.7.2.2 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.2.3 Capability Recheck

If the selected laboratory fails the capability check, the Contractor shall reimburse the Government for each succeeding recheck of the

laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.3 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.4 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to a testing laboratory on the Island of Oahu, State of Hawaii, designated by the Contracting Officer. Coordination for each specific test, exact delivery location, and dates will be made through the Government field office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a punch list of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform this inspection to verify that the facility is complete and ready to be occupied. The QC Manager shall develop a punch list of items which do not conform to the contract documents. The Government will review the punch list and add to or correct the items listed. The QC Manager shall incorporate Government comments and provide a Pre-Final Punch List. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government so that a Final inspection with the customer can be scheduled. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work or any particular increment thereof if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at this inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also

be in attendance. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Notice shall be given to the Contracting Officer at least 14 days prior to the final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be on an acceptable form that includes, as a minimum, the following information:

- a. Contractor/subcontractor and their area of responsibility.
- b. Operating plant/equipment with hours worked, idle, or down for repair.
- c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.
- d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
- e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/drawings requirements.
- f. Submittals reviewed, with contract reference, by whom, and action taken.
- g. Off-site surveillance activities, including actions taken.
- h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
- i. Instructions given/received and conflicts in plans and/or specifications.
- j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. The original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date covered

by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

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SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-18 Records

As-Built Drawings.

Drawings showing final as-built conditions of the project. The final CADD as-built drawings shall consist of one set of electronic CADD drawing files in the specified format, one set of original drawings, 2 sets of prints of the originals, and one set of the Government accepted working as-built drawings.

As-Built Record of Equipment and Materials.

Two copies of the record listing the as-built materials and equipment incorporated into the construction of the project.

Warranty Management Plan.

One set of the warranty management plan containing information relevant to the warranty of materials and equipment incorporated into the construction project, including the starting date of warranty of construction. The Contractor shall furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.

Warranty Tags.

Two record copies of the warranty tags showing the layout and design.

Final Clean-Up.

Two copies of the listing of completed final clean-up items.

1.2 PROJECT RECORD DOCUMENTS

1.2.1 As-Built Drawings

This paragraph covers as-built drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working as-built drawings" and "final as-built drawings" refer to contract drawings which are revised to be used for final as-built drawings.

1.2.1.1 Government Furnished Materials

One set of electronic CADD files in the specified software and format revised to reflect all bid amendments will be provided by the Government at the preconstruction conference for projects requiring CADD file as-built drawings.

1.2.1.2 Working As-Built and Final As-Built Drawings

The Contractor shall maintain 2 sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. These working as-built marked drawings shall be kept current on a daily basis and at least one set shall be available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. At the final inspection or upon beneficial occupancy of the facility by the user, whichever comes first. The Contractor shall provide one of the two sets of working as-built drawings to the COR for turnover with the facility. This set will serve as an advance/interim working set for the occupant of the completed facility; until such time that the final as-built drawings are furnished to them. Final as-built drawings shall be prepared after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural Steel, etc., as appropriate for the project). The working as-built marked drawings and final as-built drawings will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working and final as-built drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the as-built drawings. This monthly deduction will continue until an agreement is reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of updated drawings. The working and final as-built drawings shall show, but shall not be limited to, the following information:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the as-built drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Valves, splice boxes and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall also be recorded.

b. The location and dimensions of any changes within the building structure.

c. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

d. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

e. The topography, invert elevations and grades of drainage installed

or affected as part of the project construction.

f. Changes or modifications which result from the final inspection.

g. Where contract drawings or specifications present options, only the option selected for construction shall be shown on the final as-built drawings.

h. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, the Contractor shall furnish a contour map of the final borrow pit/spoil area elevations.

i. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.

j. Modifications (change order price shall include the Contractor's cost to change working and final as-built drawings to reflect modifications) and compliance with the following procedures.

(1) Directions in the modification for posting descriptive changes shall be followed.

(2) A Modification Circle shall be placed at the location of each deletion.

(3) For new details or sections which are added to a drawing, a Modification Circle shall be placed by the detail or section title.

(4) For minor changes, a Modification Circle shall be placed by the area changed on the drawing (each location).

(5) For major changes to a drawing, a Modification Circle shall be placed by the title of the affected plan, section, or detail at each location.

(6) For changes to schedules or drawings, a Modification Circle shall be placed either by the schedule heading or by the change in the schedule.

(7) The Modification Circle size shall be 1/2 inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

1.2.1.3 Drawing Preparation

The as-built drawings shall be modified as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with Government accepted working as-built drawings, and adding such additional drawings as may be necessary. These working as-built marked drawings shall be neat, legible and accurate. These drawings are part of the permanent records of this project and shall be returned by the Contractor to the Contracting Officer after final acceptance by the Government. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at no expense to the Government.

1.2.1.4 Computer Aided Design and Drafting (CADD) Drawings

Only personnel proficient in the preparation of microstation CADD drawings

shall be employed to modify the contract drawings or prepare additional new drawings. Additions and corrections to the contract drawings shall be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols shall be the same as the original line colors, line weights, lettering, layering conventions, and symbols. If additional drawings are required, they shall be prepared using the specified electronic file format applying the same graphic standards specified for original drawings. The title block and drawing border to be used for any new final as-built drawings shall be identical to that used on the contract drawings. Additions and corrections to the contract drawings shall be accomplished using CADD files. The Contractor will be furnished Microstation CADD files and pentable. The electronic files will be supplied on compact disc, read-only memory (CD-ROM). The Contractor shall be responsible for providing all program files and hardware necessary to prepare final as-built drawings. The Contracting Officer will review final as-built drawings for accuracy and the Contractor shall make required corrections, changes, additions, and deletions.

a. CADD colors shall be the "base" colors of red, green, and blue. Color code for changes shall be as follows:

- (1) Deletions (red) - Deleted graphic items (lines) shall be colored red with red lettering in notes and leaders.
- (2) Additions (Green) - Added items shall be drawn in green with green lettering in notes and leaders.
- (3) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes shall be in blue.

b. All changes to the contract drawing files shall be made on the level as the original item. There shall be no deletions of existing lines; existing lines shall be over struck in red. Additions shall be in green with line weights the same as the drawing.

c. When final revisions have been completed, the cover sheet drawing shall show the wording "RECORD DRAWING AS-BUILT" followed by the name of the Contractor in letters at least 3/16 inch high. All other contract drawings shall be marked either "as-built" drawing denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions. Original contract drawings shall be dated in the revision block.

d. Within 20 days after Government acceptance of all of the working as-built drawings for a phase of work, the Contractor shall prepare the final CADD as-built drawings for that phase of work and submit two sets of blue/black-line prints of these drawings for Government review. The Government will promptly return one set of prints annotated with any necessary corrections. Within 10 days the Contractor shall revise the CADD files accordingly at no additional cost and submit one set of final prints for the completed phase of work to the Government. Within 20 days of substantial completion of all phases of work, the Contractor shall submit the final as-built drawing package for the entire project. The submittal shall consist of one set of electronic files on compact disc, read-only memory (CD-ROM), one set of originals, two sets of prints and one set of the Government annotated and accepted working as-built drawings. They shall be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this is the responsibility of the

Contractor. The Government reserves the right to reject any drawing files it deems incompatible with the customer's CADD system. Paper prints, drawing files and storage media submitted will become the property of the Government upon final acceptance. Failure to submit final as-built drawing files or working as-built marked drawings as specified shall be cause for withholding any payment due the Contractor under this contract. Acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

1.2.1.5 Payment

No separate payment will be made for as-built drawings required under this contract, and all costs accrued in connection with such drawings shall be considered a subsidiary obligation of the Contractor.

1.2.2 As-Built Record of Equipment and Materials

The Contractor shall furnish one copy of preliminary record of equipment and materials used on the project 15 days prior to final inspection. This preliminary submittal will be reviewed and returned 2 days after final inspection with Government comments. Two sets of final record of equipment and materials shall be submitted 10 days after final inspection. The designations shall be keyed to the related area depicted on the contract drawings. The record shall list the following data:

RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA

Description	Specification Section	Manufacturer and Catalog, Model, and Serial Number	Composition and Size	Where Used
-------------	--------------------------	---	-------------------------	---------------

1.2.3 Final Approved Shop Drawings

The Contractor shall furnish final approved project shop drawings 30 days after transfer of the completed facility.

1.2.4 Real Property Equipment

The Contractor shall furnish a list of installed equipment furnished under this contract. The list shall include all information usually listed on manufacturer's name plate. The "EQUIPMENT-IN-PLACE LIST" shall include, as applicable, the following for each piece of equipment installed: description of item, location (by room number), model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. A draft list shall be furnished at time of transfer. The final list shall be furnished 30 days after transfer of the completed facility.

1.3 WARRANTY MANAGEMENT

1.3.1 Warranty Management Plan

The Contractor shall develop a warranty management plan. At least 30 days before the planned pre-warranty conference, the Contractor shall submit the warranty management plan for Government approval. The warranty management plan shall include all required actions and documents to assure that the Government receives all warranties to which it is entitled, in accordance

with the Contract Clause, WARRANTY OF CONSTRUCTION. The plan shall be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below shall include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase shall be submitted to the Contracting Officer for approval prior to each monthly pay estimate. Approved information shall be assembled in a binder and shall be turned over to the Government upon acceptance of the work. The construction warranty period shall begin on the date of project acceptance and shall continue for the full product warranty period. A joint 4 month and 9 month warranty inspection shall be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Information contained in the warranty management plan shall include, but shall not be limited to, the following:

a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.

b. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.

c. A list for each warranted equipment, item, feature of construction or system indicating:

1. Name of item.
2. Model and serial numbers.
3. Location where installed.
4. Name and phone numbers of manufacturers or suppliers.
5. Names, addresses and telephone numbers of sources of spare parts.
6. Warranties and terms of warranty. This shall include one-year overall warranty of construction. Items which have extended warranties shall be indicated with separate warranty expiration dates.
7. Cross-reference to warranty certificates as applicable.
8. Starting point and duration of warranty period.
9. Summary of maintenance procedures required to continue the warranty in force.
10. Cross-reference to specific pertinent Operation and Maintenance manuals.
11. Organization, names and phone numbers of persons to call for warranty service.
12. Typical response time and repair time expected for various warranted equipment.

d. The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

e. Procedure and status of tagging of all equipment covered by extended warranties.

f. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

1.3.2 Performance Bond

The Contractor's Performance Bond shall remain in effect throughout the construction period, and during the life of any guaranty required under the Contract Performance Bond, Standard Form 25.

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others. After completion of the construction warranty work, charges will be made to the remaining construction warranty funds of expenses which the Government incurred while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government, at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, the Contractor shall respond in a timely manner. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.3.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty shall be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor shall furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, shall be continuously available, and shall be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

1.3.4 Contractor's Response to Construction Warranty Service Requirements

Following oral or written notification by the Contracting Officer, the Contractor shall respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. The Contractor shall submit a report on any warranty item that has been repaired during the warranty period. The report shall include the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the timeframes specified, the Government will perform the work and backcharge the construction warranty payment item established.

a. First Priority Code 1. Perform onsite inspection to evaluate

situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.

b. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.

c. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.

d. The "Construction Warranty Service Priority List" is as follows:

Code 1-Doors

- (1) Overhead doors not operational, causing a security, fire, or safety problem.
- (2) Interior, exterior personnel doors or hardware, not functioning properly, causing a security, fire, or safety problem.

Code 3-Doors

- (1) Overhead doors not operational.
- (2) Interior/exterior personnel doors or hardware not functioning properly.

Code 1-Electrical

- (1) Power failure (entire area or any building operational after 1600 hours).
- (2) Security lights
- (3) Smoke detectors

Code 2-Electrical

- (1) Power failure (no power to a room or part of building).
- (2) Receptacle and lights (in a room or part of building).

Code 3-Electrical

Street lights.

Code 2-Kitchen Equipment

- (1) Dishwasher not operating properly.
- (2) All other equipment hampering preparation of a meal.

Code 1-Plumbing

- (1) Hot water heater failure.
- (2) Leaking water supply pipes.

Code 2-Plumbing

- (1) Flush valves not operating properly.
- (2) Fixture drain, supply line to commode, or any water pipe leaking.
- (3) Commode leaking at base.

Code 3 -Plumbing

Leaky faucets.

Code 3-Interior

- (1) Floors damaged.
- (2) Paint chipping or peeling.
- (3) Casework.

Code 1-Roof Leaks

Temporary repairs will be made where major damage to property is occurring.

Code 2-Roof Leaks

Where major damage to property is not occurring, check for location of leak during rain and complete repairs on a Code 2 basis.

Code 2-Water (Exterior)

No water to facility.

Code 2-Water (Hot)

No hot water in portion of building listed.

Code 3-All other work not listed above.

1.3.5 Warranty Tags

At the time of installation, each warranted item shall be tagged with a durable, oil and water resistant tag approved by the Contracting Officer. Each tag shall be attached with a copper wire and shall be sprayed with a silicone waterproof coating. The date of acceptance and the QC signature shall remain blank until project is accepted for beneficial occupancy. The tag shall show the following information.

- a. Type of product/material_____.
- b. Model number_____.
- c. Serial number_____.
- d. Contract number_____.
- e. Warranty period_____from_____to_____.
- f. Inspector's signature_____.
- g. Construction Contractor_____.
- Address_____.
- Telephone number_____.
- h. Warranty contact_____.
- Address_____.
- Telephone number_____.
- i. Warranty response time priority code_____.

j. WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.

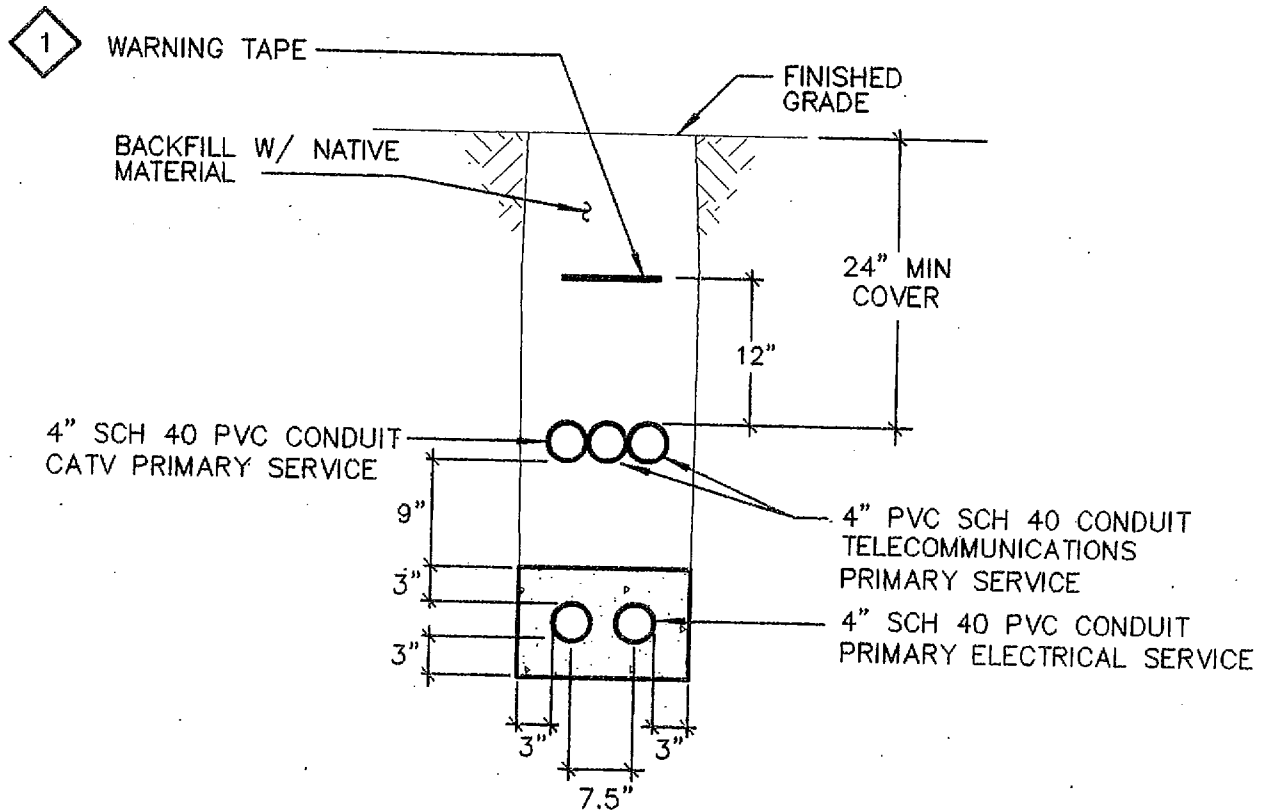
PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

ATTACHMENT 18

DUCT SECTION PRIMARY ELECTRICAL TELECOMMUNICATIONS & CATV
(FOR AREA J)

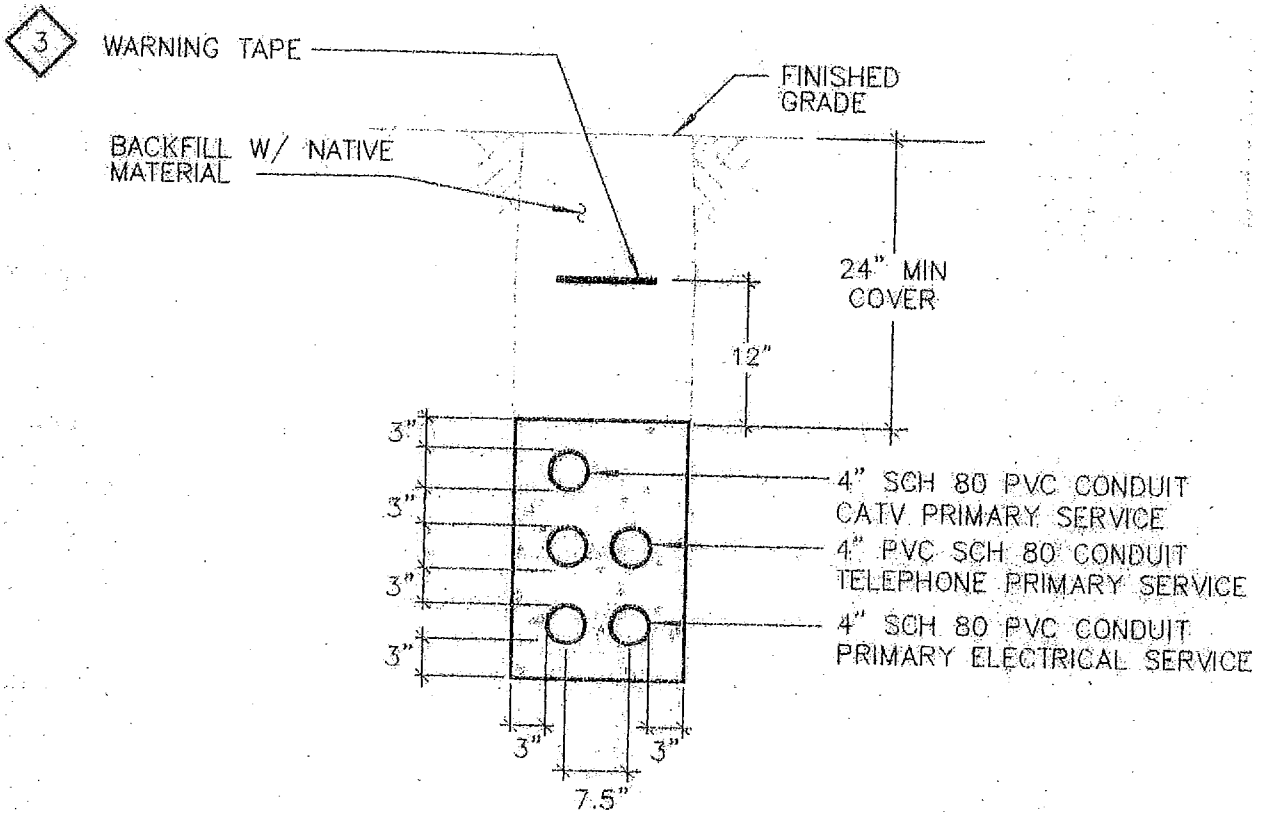


**SECTION - PRIMARY ELECTRICAL
TELECOMMUNICATIONS & CATV**

(FOR AREA J)

ATTACHMENT 19

DUCT SECTION PRIMARY ELECTRICAL TELECOMMUNICATIONS & CATV
(FOR AREA U)

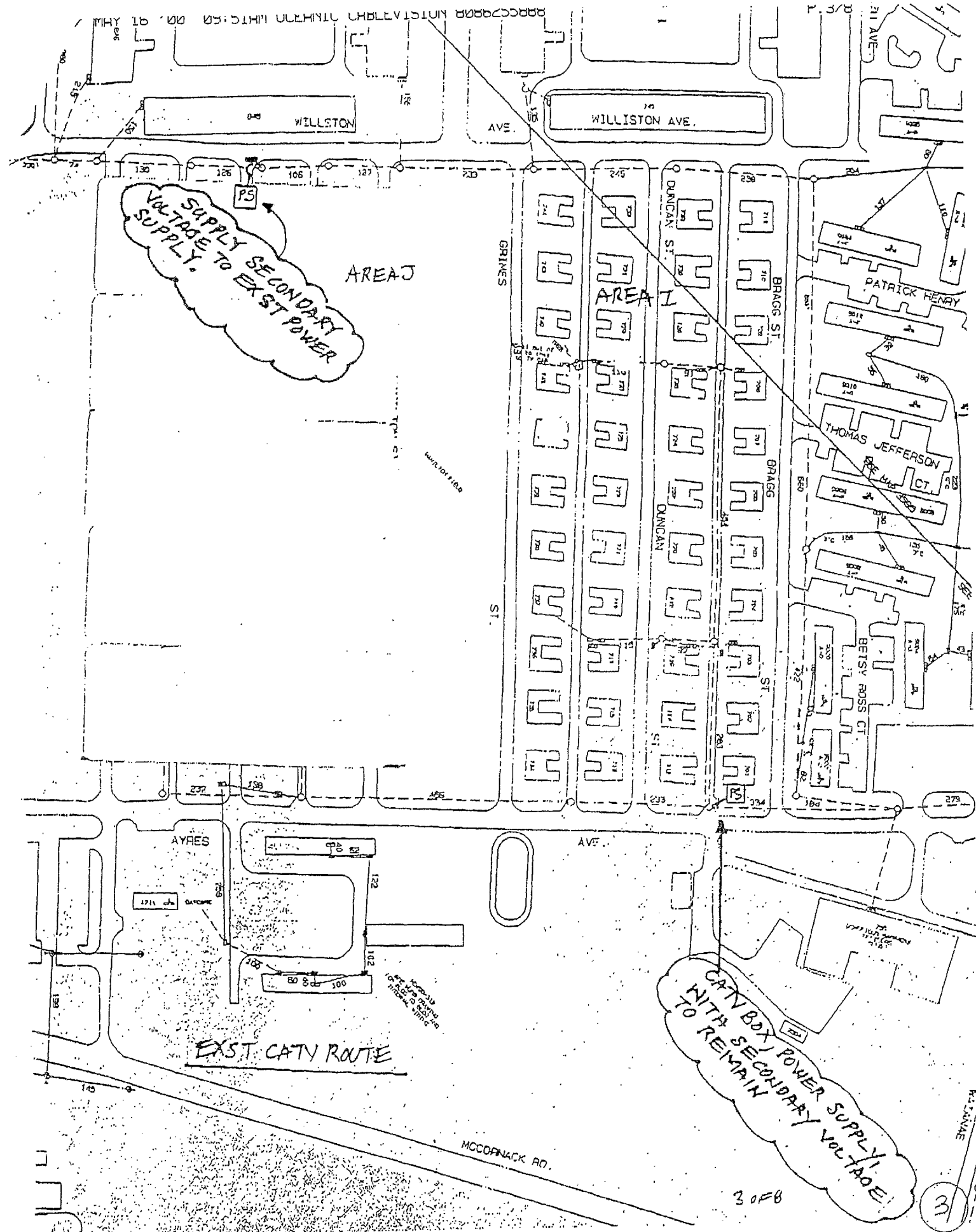


SECTION - PRIMARY ELECTRICAL
TELEPHONE & CATV

(FOR AREA 4)

ATTACHMENT 20

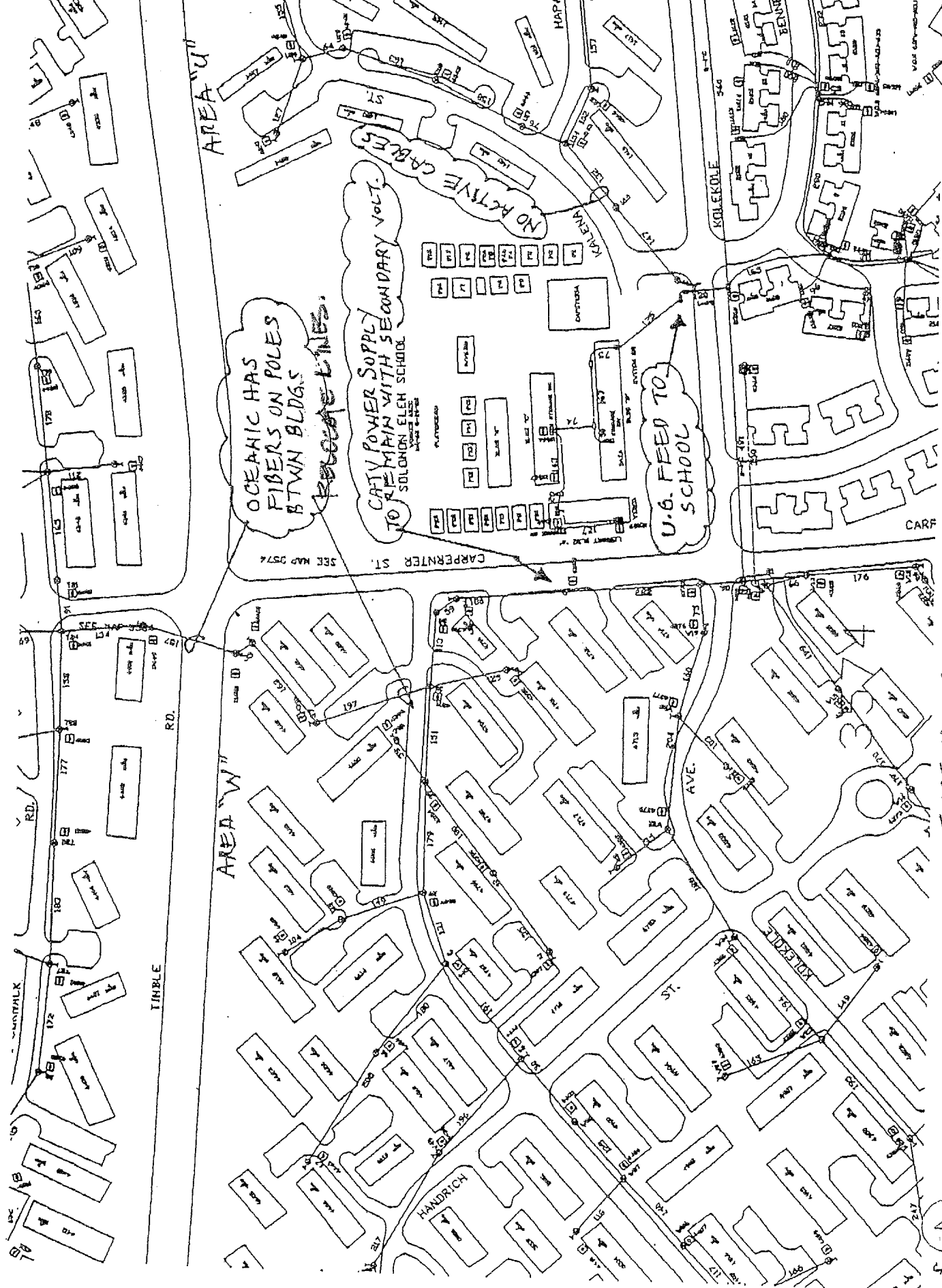
CATV REQUIREMENTS FOR AREA I AND J



CATV REQMTS FOR AREA I AND J

ATTACHMENT 21

CATV REQUIREMENTS FOR AREA U AND W

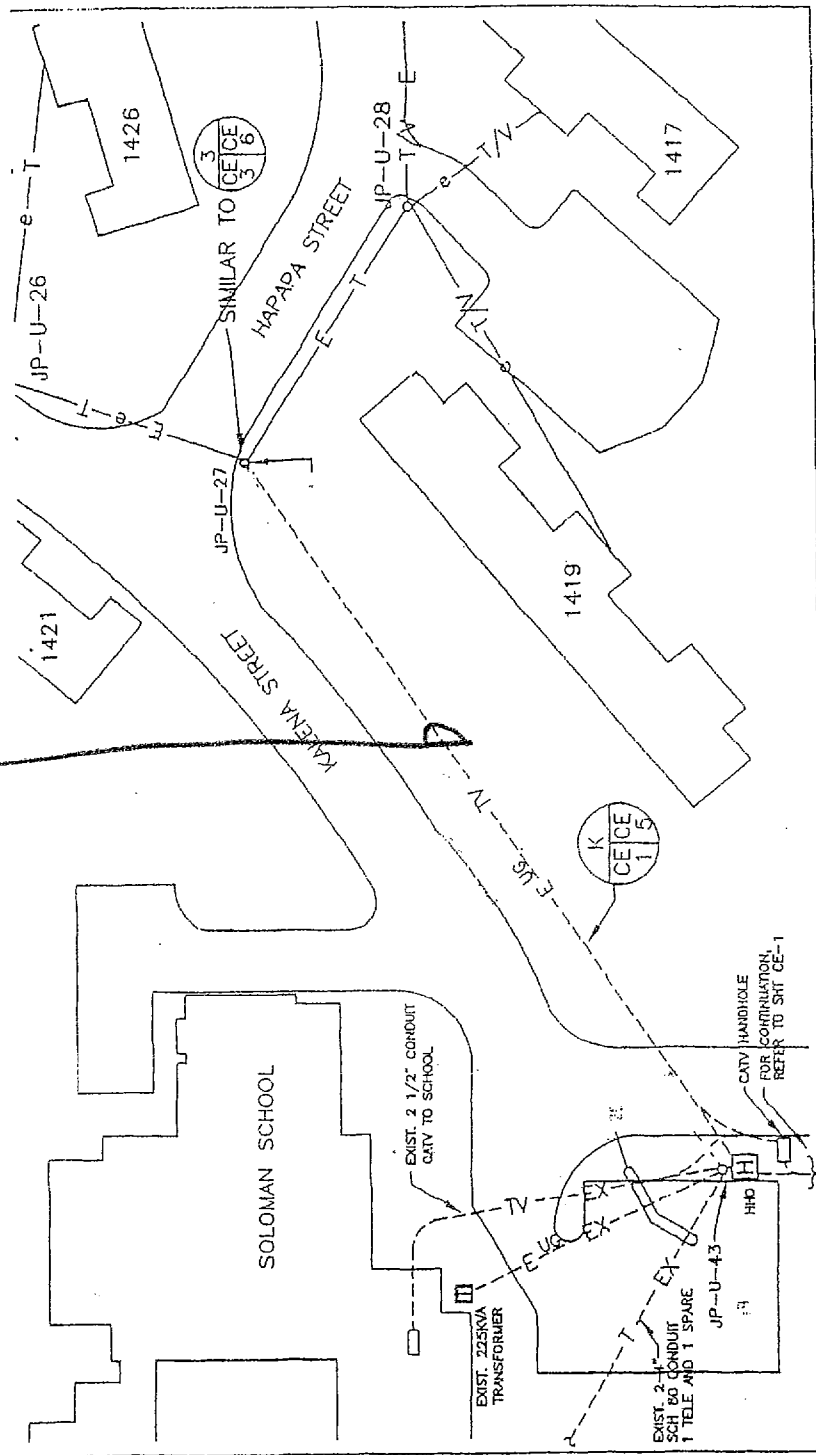


EXST CATV ROUTE
CATV REQMTS FOR AREA U AND W

ATTACHMENT 22

ABANDONED DUCTLINE REMOVAL - SOLOMAN SCHOOL/ AREA U

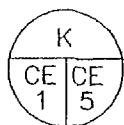
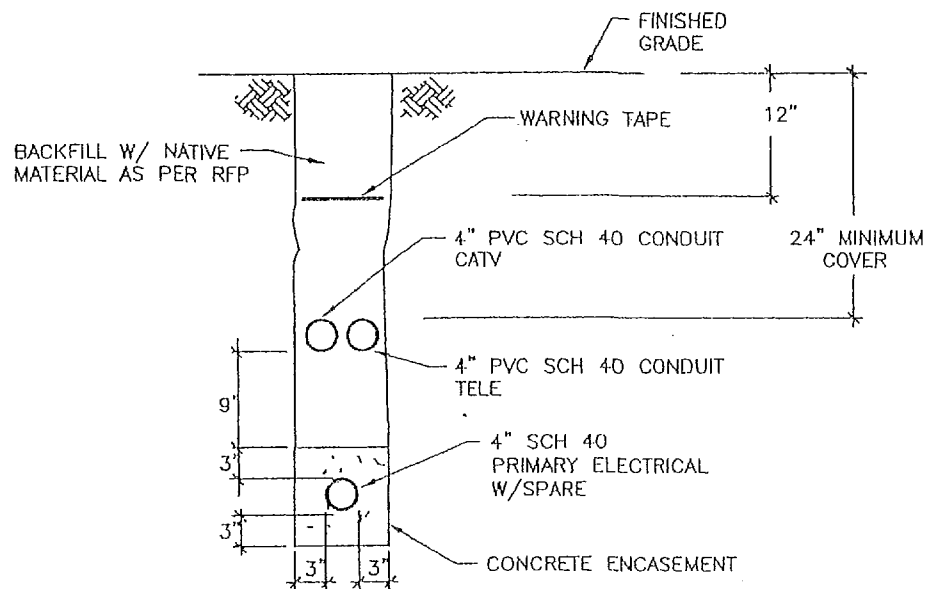
EXIST ABANDONED DUCT LINE
TO BE REMOVED FROM JP-U-27
TO HHO.



SOLOMAN SCHOOL / AREA "U"

SCALE 1"=40'-0"

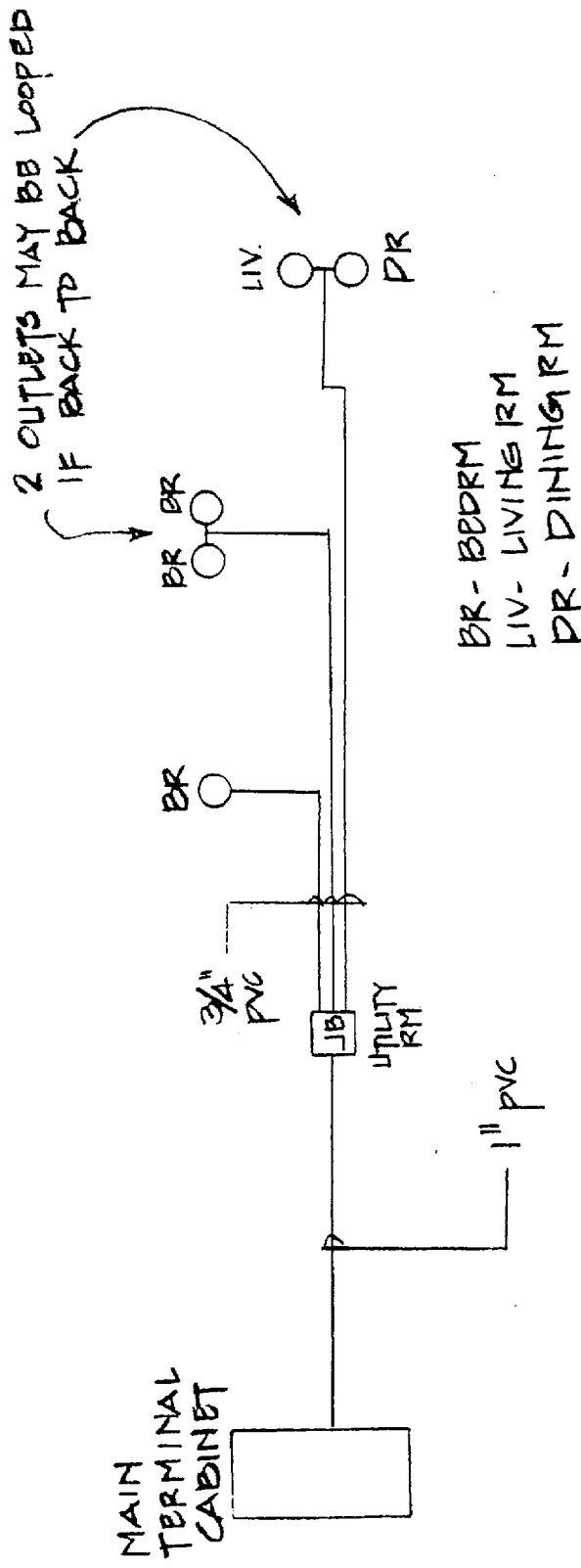
ABANDONED DUCT LINE REMOVAL - SOLOMAN SCHOOL / AREA "U"



SECTION-PRIMARY SERVICE

ATTACHMENT 23

TYPICAL BUILDING/DWELLING UNIT CATV LAYOUT
AND POINT OF CONNECTION FOR CATV & TELECOMMUNICATION SYSTEMS



NOTES:

1. PROVIDE CONVENIENCE RECEPTACLE ADJACENT TO J-BOX IN UTILITY RM.
2. J-BOX SHALL BE 6" X 6" MIN.
3. LAYOUT FOR TYPICAL TOWNHOMES 8 UNITS MAX PER BLDG

TYPICAL BUILDING / DWELLING UNIT

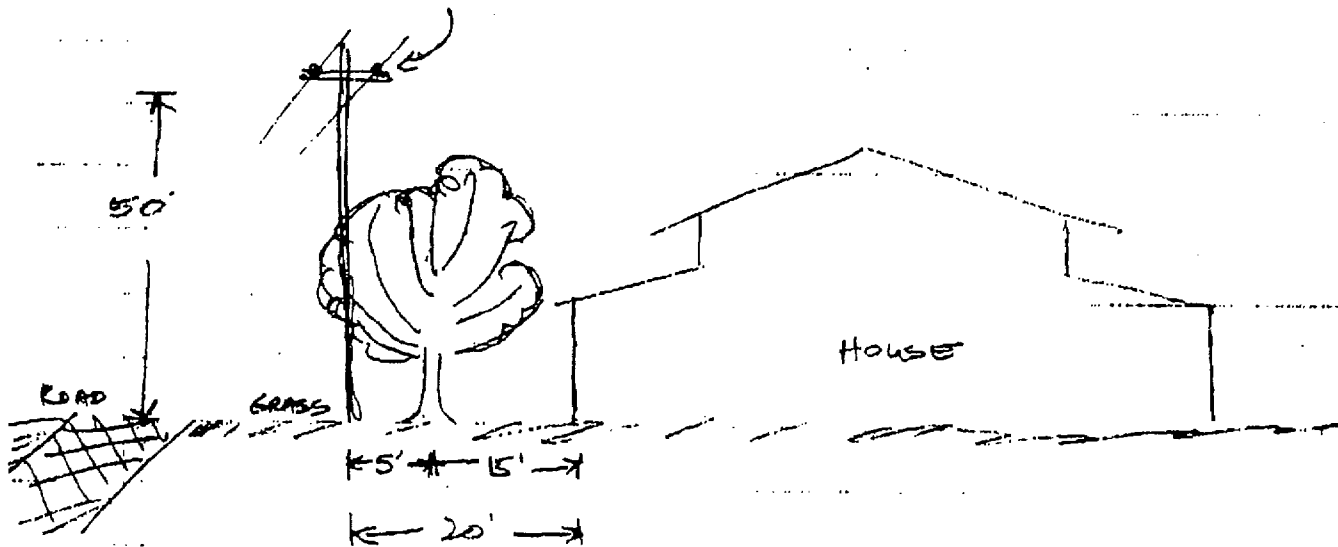
CATV LAYOUT

ATTACHMENT 24

CADET SHERIDAN TREE PLANTING

CADET SHERIDAN TREE PLANTING

HIGH VOLTAGE POWERLINE



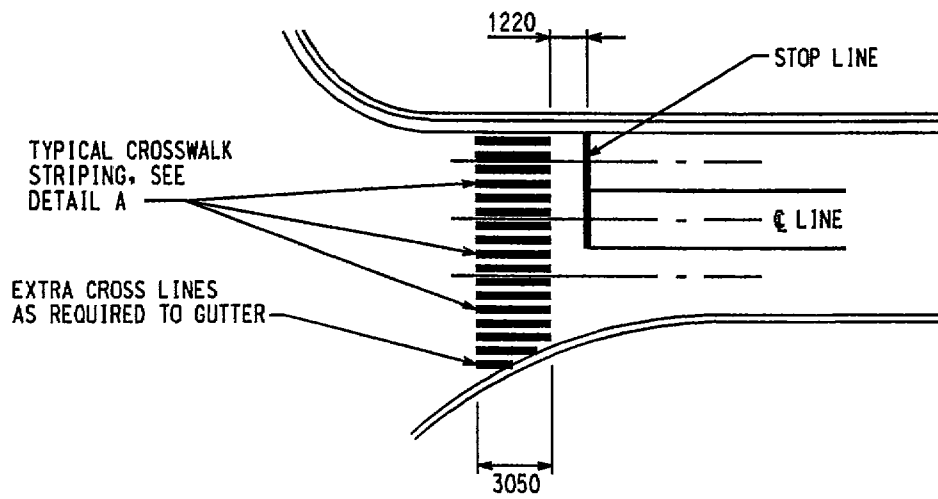
PLANT FALSE OLIVE TREE (ELAEDODENDRON ORIENTALE)

- MATURE HT 30-35'
- NON-AGGRESSIVE ROOT SYSTEM
- MINIMUM MAINTENANCE
- SHADE TREE / NO COLOR
- SPACING 20' APART
- MAINTAIN DISTANCE 5' FROM UTILITY POLE
- POT SIZE 15 GALLON, HT 6', SPREAD 3'

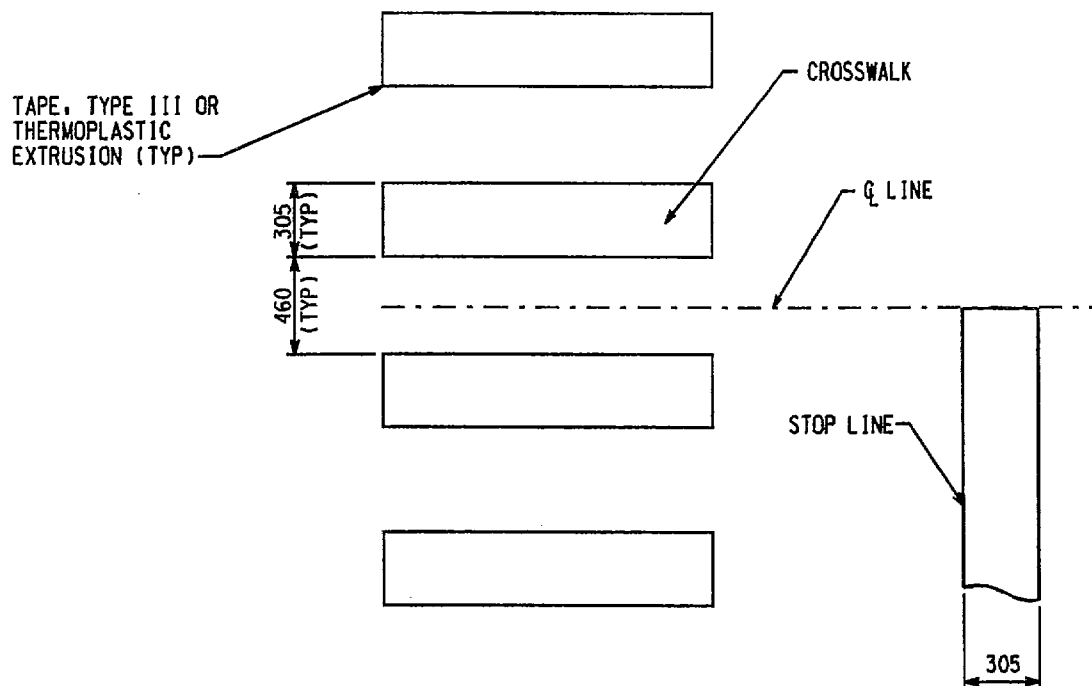
Pat Chung
20 May 78

Attachment 24

ATTACHMENT 25
CROSSWALK & STOP LINE DETAIL



PLAN
NOT TO SCALE



DETAIL "A"
NOT TO SCALE

NOTE: UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN MILLIMETERS.

FY01 FHNC PN 48456 REPLACE FAMILY HOUSING HOUSING AREAS "I", "J", "U" AND "W"

CROSSWALK &
STOP LINE DETAIL

APRIL 2000

ATTACHMENT 25

ATTACHMENT 26

DD FORM 1354

DD Form 1354: DD Form 1354, Transfer and Acceptance of Military Real Property, shall be prepared in accordance with ER 415-345-38, Transfer and Warranties, and in accordance with the "How to complete a DD Form 1354" instructions described in section _____. A sample of a DD Form for another project is included as a guide. The DD Form 1354 shall be prepared and submitted to the Contracting Officer's Representative within 30 days after the completion of the design. The submitted DD Form 1354 will be returned for incorporation of comments if the form is not correctly completed. Three (3) printed sets and one (1) electronic file of the completed DD Form 1354 shall be furnished for each submittal. The electronic file shall be in Microsoft Excel. (A copy of DA PAM 415-28, Real Property Category Codes, may be down loaded from the bottom of web page <http://www.usacpw.belvoir.army.mil/librarie/ARS/Ars.htm>. A Microsoft Excel file of a blank DD Form 1354 may be requested from the Contracting Officer's Representative.)

How to complete a DD Form 1354.

The DD Form 1354, Transfer and Acceptance of Military Real Property, requires the preparer to collect a vast quantity of information about the project. Such information (e.g. a description of the Real Property being acted on such as built, transferred, disposed, etc.; costing, to include design and other construction costs; as-built drawing numbers) need to be on-hand in order to expedite the processing of the DD Form 1354 documentation.

The following will explain how to fill out the thirty-one (31) individual elements/blocks on DD Form 1354. A layout of the front page of the DD Form 1354 is displayed below. The position of each block on the DD Form 1354 appears with each explanation of a block. A sample DD form 1354, both front and back, is displayed on the last two pages.

Block 1. [From]

This block will include the name of the transferring agency, such as the organization, installation Directorate of Public Works (DPW), USACE District Offices, and other organizations such as Army Air Force Exchange Service (AAFES), Navy Facilities Engineering Command (NACFAC). It should include the full address and zip code. Simply, this block is used to identify those accomplishing the new construction for transfer, or initiating the transfer of existing Real Property.

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY										DATE	BY	FOR
1. TRANSFEROR (ORGANIZATION)	2. PROPERTY NO.	3. PROPERTY NAME	4. PROPERTY ADDRESS	5. VALUE	6. TYPE OF PROPERTY	7. TYPE OF TRANSFER	8. TYPE OF TRANSFER	9. TYPE OF TRANSFER	10. TYPE OF TRANSFER			
11. TRANSFEROR'S DESCRIPTION	12. PROPERTY NO.	13. PROPERTY NAME	14. PROPERTY ADDRESS	15. VALUE ORIGIN ORIGIN ORIGIN	16. TYPE OF PROPERTY	17. TYPE OF TRANSFER	18. TYPE OF TRANSFER	19. TYPE OF TRANSFER	20. TYPE OF TRANSFER			
21. TRANSFEROR'S DESCRIPTION	22. PROPERTY NO.	23. PROPERTY NAME	24. PROPERTY ADDRESS	25. VALUE ORIGIN ORIGIN ORIGIN	26. TYPE OF PROPERTY	27. TYPE OF TRANSFER	28. TYPE OF TRANSFER	29. TYPE OF TRANSFER	30. TYPE OF TRANSFER			
31. TRANSFEROR'S DESCRIPTION	32. PROPERTY NO.	33. PROPERTY NAME	34. PROPERTY ADDRESS	35. VALUE ORIGIN ORIGIN ORIGIN	36. TYPE OF PROPERTY	37. TYPE OF TRANSFER	38. TYPE OF TRANSFER	39. TYPE OF TRANSFER	40. TYPE OF TRANSFER			
41. TRANSFEROR'S DESCRIPTION	42. PROPERTY NO.	43. PROPERTY NAME	44. PROPERTY ADDRESS	45. VALUE ORIGIN ORIGIN ORIGIN	46. TYPE OF PROPERTY	47. TYPE OF TRANSFER	48. TYPE OF TRANSFER	49. TYPE OF TRANSFER	50. TYPE OF TRANSFER			
51. TRANSFEROR'S DESCRIPTION	52. PROPERTY NO.	53. PROPERTY NAME	54. PROPERTY ADDRESS	55. VALUE ORIGIN ORIGIN ORIGIN	56. TYPE OF PROPERTY	57. TYPE OF TRANSFER	58. TYPE OF TRANSFER	59. TYPE OF TRANSFER	60. TYPE OF TRANSFER			
61. TRANSFEROR'S DESCRIPTION	62. PROPERTY NO.	63. PROPERTY NAME	64. PROPERTY ADDRESS	65. VALUE ORIGIN ORIGIN ORIGIN	66. TYPE OF PROPERTY	67. TYPE OF TRANSFER	68. TYPE OF TRANSFER	69. TYPE OF TRANSFER	70. TYPE OF TRANSFER			
71. TRANSFEROR'S DESCRIPTION	72. PROPERTY NO.	73. PROPERTY NAME	74. PROPERTY ADDRESS	75. VALUE ORIGIN ORIGIN ORIGIN	76. TYPE OF PROPERTY	77. TYPE OF TRANSFER	78. TYPE OF TRANSFER	79. TYPE OF TRANSFER	80. TYPE OF TRANSFER			
81. TRANSFEROR'S DESCRIPTION	82. PROPERTY NO.	83. PROPERTY NAME	84. PROPERTY ADDRESS	85. VALUE ORIGIN ORIGIN ORIGIN	86. TYPE OF PROPERTY	87. TYPE OF TRANSFER	88. TYPE OF TRANSFER	89. TYPE OF TRANSFER	90. TYPE OF TRANSFER			
91. TRANSFEROR'S DESCRIPTION	92. PROPERTY NO.	93. PROPERTY NAME	94. PROPERTY ADDRESS	95. VALUE ORIGIN ORIGIN ORIGIN	96. TYPE OF PROPERTY	97. TYPE OF TRANSFER	98. TYPE OF TRANSFER	99. TYPE OF TRANSFER	100. TYPE OF TRANSFER			
101. TRANSFEROR'S DESCRIPTION	102. PROPERTY NO.	103. PROPERTY NAME	104. PROPERTY ADDRESS	105. VALUE ORIGIN ORIGIN ORIGIN	106. TYPE OF PROPERTY	107. TYPE OF TRANSFER	108. TYPE OF TRANSFER	109. TYPE OF TRANSFER	110. TYPE OF TRANSFER			
111. TRANSFEROR'S DESCRIPTION	112. PROPERTY NO.	113. PROPERTY NAME	114. PROPERTY ADDRESS	115. VALUE ORIGIN ORIGIN ORIGIN	116. TYPE OF PROPERTY	117. TYPE OF TRANSFER	118. TYPE OF TRANSFER	119. TYPE OF TRANSFER	120. TYPE OF TRANSFER			
121. TRANSFEROR'S DESCRIPTION	122. PROPERTY NO.	123. PROPERTY NAME	124. PROPERTY ADDRESS	125. VALUE ORIGIN ORIGIN ORIGIN	126. TYPE OF PROPERTY	127. TYPE OF TRANSFER	128. TYPE OF TRANSFER	129. TYPE OF TRANSFER	130. TYPE OF TRANSFER			
131. TRANSFEROR'S DESCRIPTION	132. PROPERTY NO.	133. PROPERTY NAME	134. PROPERTY ADDRESS	135. VALUE ORIGIN ORIGIN ORIGIN	136. TYPE OF PROPERTY	137. TYPE OF TRANSFER	138. TYPE OF TRANSFER	139. TYPE OF TRANSFER	140. TYPE OF TRANSFER			
141. TRANSFEROR'S DESCRIPTION	142. PROPERTY NO.	143. PROPERTY NAME	144. PROPERTY ADDRESS	145. VALUE ORIGIN ORIGIN ORIGIN	146. TYPE OF PROPERTY	147. TYPE OF TRANSFER	148. TYPE OF TRANSFER	149. TYPE OF TRANSFER	150. TYPE OF TRANSFER			
151. TRANSFEROR'S DESCRIPTION	152. PROPERTY NO.	153. PROPERTY NAME	154. PROPERTY ADDRESS	155. VALUE ORIGIN ORIGIN ORIGIN	156. TYPE OF PROPERTY	157. TYPE OF TRANSFER	158. TYPE OF TRANSFER	159. TYPE OF TRANSFER	160. TYPE OF TRANSFER			
161. TRANSFEROR'S DESCRIPTION	162. PROPERTY NO.	163. PROPERTY NAME	164. PROPERTY ADDRESS	165. VALUE ORIGIN ORIGIN ORIGIN	166. TYPE OF PROPERTY	167. TYPE OF TRANSFER	168. TYPE OF TRANSFER	169. TYPE OF TRANSFER	170. TYPE OF TRANSFER			
171. TRANSFEROR'S DESCRIPTION	172. PROPERTY NO.	173. PROPERTY NAME	174. PROPERTY ADDRESS	175. VALUE ORIGIN ORIGIN ORIGIN	176. TYPE OF PROPERTY	177. TYPE OF TRANSFER	178. TYPE OF TRANSFER	179. TYPE OF TRANSFER	180. TYPE OF TRANSFER			
181. TRANSFEROR'S DESCRIPTION	182. PROPERTY NO.	183. PROPERTY NAME	184. PROPERTY ADDRESS	185. VALUE ORIGIN ORIGIN ORIGIN	186. TYPE OF PROPERTY	187. TYPE OF TRANSFER	188. TYPE OF TRANSFER	189. TYPE OF TRANSFER	190. TYPE OF TRANSFER			
191. TRANSFEROR'S DESCRIPTION	192. PROPERTY NO.	193. PROPERTY NAME	194. PROPERTY ADDRESS	195. VALUE ORIGIN ORIGIN ORIGIN	196. TYPE OF PROPERTY	197. TYPE OF TRANSFER	198. TYPE OF TRANSFER	199. TYPE OF TRANSFER	200. TYPE OF TRANSFER			
201. TRANSFEROR'S DESCRIPTION	202. PROPERTY NO.	203. PROPERTY NAME	204. PROPERTY ADDRESS	205. VALUE ORIGIN ORIGIN ORIGIN	206. TYPE OF PROPERTY	207. TYPE OF TRANSFER	208. TYPE OF TRANSFER	209. TYPE OF TRANSFER	210. TYPE OF TRANSFER			
211. TRANSFEROR'S DESCRIPTION	212. PROPERTY NO.	213. PROPERTY NAME	214. PROPERTY ADDRESS	215. VALUE ORIGIN ORIGIN ORIGIN	216. TYPE OF PROPERTY	217. TYPE OF TRANSFER	218. TYPE OF TRANSFER	219. TYPE OF TRANSFER	220. TYPE OF TRANSFER			
221. TRANSFEROR'S DESCRIPTION	222. PROPERTY NO.	223. PROPERTY NAME	224. PROPERTY ADDRESS	225. VALUE ORIGIN ORIGIN ORIGIN	226. TYPE OF PROPERTY	227. TYPE OF TRANSFER	228. TYPE OF TRANSFER	229. TYPE OF TRANSFER	230. TYPE OF TRANSFER			
231. TRANSFEROR'S DESCRIPTION	232. PROPERTY NO.	233. PROPERTY NAME	234. PROPERTY ADDRESS	235. VALUE ORIGIN ORIGIN ORIGIN	236. TYPE OF PROPERTY	237. TYPE OF TRANSFER	238. TYPE OF TRANSFER	239. TYPE OF TRANSFER	240. TYPE OF TRANSFER			
241. TRANSFEROR'S DESCRIPTION	242. PROPERTY NO.	243. PROPERTY NAME	244. PROPERTY ADDRESS	245. VALUE ORIGIN ORIGIN ORIGIN	246. TYPE OF PROPERTY	247. TYPE OF TRANSFER	248. TYPE OF TRANSFER	249. TYPE OF TRANSFER	250. TYPE OF TRANSFER			
251. TRANSFEROR'S DESCRIPTION	252. PROPERTY NO.	253. PROPERTY NAME	254. PROPERTY ADDRESS	255. VALUE ORIGIN ORIGIN ORIGIN	256. TYPE OF PROPERTY	257. TYPE OF TRANSFER	258. TYPE OF TRANSFER	259. TYPE OF TRANSFER	260. TYPE OF TRANSFER			
261. TRANSFEROR'S DESCRIPTION	262. PROPERTY NO.	263. PROPERTY NAME	264. PROPERTY ADDRESS	265. VALUE ORIGIN ORIGIN ORIGIN	266. TYPE OF PROPERTY							

Block 7. [Serial Number] For other than Army use.

[illegible]

3 of 16

Block 9. [To] This will include the name of the organization or agency receiving the Real Property. This could be an Army installation DPW, USACE district, etc, that has been assigned the responsibility for accounting for the Real Property. The address and zip code will always be included.

[illegible]

Example: Engineering Plans & Services Division
Directorate of Public Works
Fort George G. Meade, MD 20755-5115

Block 10. [Operating Unit] For other than Army use.

Block 11. [District Code] For other than Army use.

Block 12. [Operating Agency] For other than Army use.

Block 13. [Accounting Number] For other than Army use.

Block 14. [Accountable Officer Number] For other than Army use.

Block 15. [Type of Transaction] This block is divided into two sections. The first section will identify whether the Real Property is new construction, an existing facility, capital improvement, or other real property transaction. The second section will indicate whether it is the final cost of the project, beneficial occupancy, Physical completion, or >other= reason(s) for using the DD Form 1354.

The USACE Supporting Engineering District, Installation Directorate of Public Works, or other Design/Construction Agent must indicate on the DD Form 1354 whether costs shown are preliminary or final. When it is a preliminary (or estimated) costs, the Real Property officer will create a suspense file to ensure that the district furnishes an updated DD Form 1354 with the final construction costs. Updates to the database should be handled accordingly. It should be noted that final costs may take several months or, if legal claims are involved, one or more years.

items in this block can occur simultaneously. For instance for the same reporting quarter the DD Form 1354 can be filled out for beneficial occupancy, physical completion of the facility, and final cost having been provided to the contractor. Also >other= might be marked; e.g. if Demolition was necessary before the beginning of construction.

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY											
1. PROJECT NUMBER		2. PROJECT NAME		3. PROJECT LOCATION		4. PROJECT STATUS		5. PROJECT TYPE		6. PROJECT DATE	
7. PROJECT DESCRIPTION		8. PROJECT PURPOSE		9. PROJECT BENEFIT		10. PROJECT COST		11. PROJECT FUNDING		12. PROJECT OTHER	
13. PROJECT HISTORY		14. PROJECT STATUS		15. PROJECT TYPE		16. PROJECT COST		17. PROJECT FUNDING		18. PROJECT OTHER	
19. PROJECT HISTORY		20. PROJECT STATUS		21. PROJECT TYPE		22. PROJECT COST		23. PROJECT FUNDING		24. PROJECT OTHER	
25. PROJECT HISTORY		26. PROJECT STATUS		27. PROJECT TYPE		28. PROJECT COST		29. PROJECT FUNDING		30. PROJECT OTHER	
31. PROJECT HISTORY		32. PROJECT STATUS		33. PROJECT TYPE		34. PROJECT COST		35. PROJECT FUNDING		36. PROJECT OTHER	
37. PROJECT HISTORY		38. PROJECT STATUS		39. PROJECT TYPE		40. PROJECT COST		41. PROJECT FUNDING		42. PROJECT OTHER	
43. PROJECT HISTORY		44. PROJECT STATUS		45. PROJECT TYPE		46. PROJECT COST		47. PROJECT FUNDING		48. PROJECT OTHER	
49. PROJECT HISTORY		50. PROJECT STATUS		51. PROJECT TYPE		52. PROJECT COST		53. PROJECT FUNDING		54. PROJECT OTHER	
55. PROJECT HISTORY		56. PROJECT STATUS		57. PROJECT TYPE		58. PROJECT COST		59. PROJECT FUNDING		60. PROJECT OTHER	
61. PROJECT HISTORY		62. PROJECT STATUS		63. PROJECT TYPE		64. PROJECT COST		65. PROJECT FUNDING		66. PROJECT OTHER	
67. PROJECT HISTORY		68. PROJECT STATUS		69. PROJECT TYPE		70. PROJECT COST		71. PROJECT FUNDING		72. PROJECT OTHER	
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91. PROJECT HISTORY		92. PROJECT STATUS		93. PROJECT TYPE		94. PROJECT COST		95. PROJECT FUNDING		96. PROJECT OTHER	
97. PROJECT HISTORY		98. PROJECT STATUS		99. PROJECT TYPE		100. PROJECT COST		101. PROJECT FUNDING		102. PROJECT OTHER	
103. PROJECT HISTORY		104. PROJECT STATUS		105. PROJECT TYPE		106. PROJECT COST		107. PROJECT FUNDING		108. PROJECT OTHER	
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115. PROJECT HISTORY		116. PROJECT STATUS		117. PROJECT TYPE		118. PROJECT COST		119. PROJECT FUNDING		120. PROJECT OTHER	
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187. PROJECT HISTORY		188. PROJECT STATUS		189. PROJECT TYPE		190. PROJECT COST		191. PROJECT FUNDING		192. PROJECT OTHER	
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211. PROJECT HISTORY		212. PROJECT STATUS		213. PROJECT TYPE		214. PROJECT COST		215. PROJECT FUNDING		216. PROJECT OTHER	
217. PROJECT HISTORY		218. PROJECT STATUS		219. PROJECT TYPE		220. PROJECT COST		221. PROJECT FUNDING		222. PROJECT OTHER	
223. PROJECT HISTORY		224. PROJECT STATUS		225. PROJECT TYPE		226. PROJECT COST		227. PROJECT FUNDING		228. PROJECT OTHER	
229. PROJECT HISTORY		230. PROJECT STATUS		231. PROJECT TYPE		232. PROJECT COST		233. PROJECT FUNDING		234. PROJECT OTHER	
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241. PROJECT HISTORY		242. PROJECT STATUS		243. PROJECT TYPE		244. PROJECT COST		245. PROJECT FUNDING		246. PROJECT OTHER	
247. PROJECT HISTORY		248. PROJECT STATUS		249. PROJECT TYPE		250. PROJECT COST		251. PROJECT FUNDING		252. PROJECT OTHER	
253. PROJECT HISTORY		254. PROJECT STATUS		255. PROJECT TYPE		256. PROJECT COST		257. PROJECT FUNDING		258. PROJECT OTHER	
259. PROJECT HISTORY		260. PROJECT STATUS		261. PROJECT TYPE		262. PROJECT COST		263. PROJECT FUNDING		264. PROJECT OTHER	
265. PROJECT HISTORY		266. PROJECT STATUS		267. PROJECT TYPE		268. PROJECT COST		269. PROJECT FUNDING		270. PROJECT OTHER	
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289. PROJECT HISTORY		290. PROJECT STATUS		291. PROJECT TYPE		292. PROJECT COST		293. PROJECT FUNDING		294. PROJECT OTHER	
295. PROJECT HISTORY		296. PROJECT STATUS		297. PROJECT TYPE		298. PROJECT COST		299. PROJECT FUNDING		300. PROJECT OTHER	
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313. PROJECT HISTORY		314. PROJECT STATUS		315. PROJECT TYPE		316. PROJECT COST		317. PROJECT FUNDING		318. PROJECT OTHER	
319. PROJECT HISTORY		320. PROJECT STATUS		321. PROJECT TYPE		322. PROJECT COST		323. PROJECT FUNDING		324. PROJECT OTHER	
325. PROJECT HISTORY		326. PROJECT STATUS		327. PROJECT TYPE		328. PROJECT COST		329. PROJECT FUNDING		330. PROJECT OTHER	
331. PROJECT HISTORY		332. PROJECT STATUS		333. PROJECT TYPE		334. PROJECT COST		335. PROJECT FUNDING		336. PROJECT OTHER	
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349. PROJECT HISTORY		350. PROJECT STATUS		351. PROJECT TYPE		352. PROJECT COST		353. PROJECT FUNDING		354. PROJECT OTHER	
355. PROJECT HISTORY		356. PROJECT STATUS		357. PROJECT TYPE		358. PROJECT COST		359. PROJECT FUNDING		360. PROJECT OTHER	
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385. PROJECT HISTORY		386. PROJECT STATUS		387. PROJECT TYPE		388. PROJECT COST		389. PROJECT FUNDING		390. PROJECT OTHER	
391. PROJECT HISTORY		392. PROJECT STATUS		393. PROJECT TYPE		394. PROJECT COST		395. PROJECT FUNDING		396. PROJECT OTHER	
397. PROJECT HISTORY		398. PROJECT STATUS		399. PROJECT TYPE		400. PROJECT COST		401. PROJECT FUNDING		402. PROJECT OTHER	
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433. PROJECT HISTORY		434. PROJECT STATUS		435. PROJECT TYPE		436. PROJECT COST		437. PROJECT FUNDING		438. PROJECT OTHER	
439. PROJECT HISTORY		440. PROJECT STATUS		441. PROJECT TYPE		442. PROJECT COST		443. PROJECT FUNDING		444. PROJECT OTHER	
445. PROJECT HISTORY		446. PROJECT STATUS		447. PROJECT TYPE		448. PROJECT COST		449. PROJECT FUNDING		450. PROJECT OTHER	
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457. PROJECT HISTORY		458. PROJECT STATUS		459. PROJECT TYPE		460. PROJECT COST		461. PROJECT FUNDING		462. PROJECT OTHER	
463. PROJECT HISTORY		464. PROJECT STATUS		465. PROJECT TYPE		466. PROJECT COST		467. PROJECT FUNDING		468. PROJECT OTHER	
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475. PROJECT HISTORY		476. PROJECT STATUS		477. PROJECT TYPE		478. PROJECT COST		479. PROJECT FUNDING		480. PROJECT OTHER	
481. PROJECT HISTORY		482. PROJECT STATUS		483. PROJECT TYPE		484. PROJECT COST		485. PROJECT FUNDING		486. PROJECT OTHER	
487. PROJECT HISTORY		488. PROJECT STATUS		489. PROJECT TYPE		490. PROJECT COST		491. PROJECT FUNDING		492. PROJECT OTHER	
493. PROJECT HISTORY		494. PROJECT STATUS		495. PROJECT TYPE		496. PROJECT COST		497. PROJECT FUNDING		498. PROJECT OTHER	
499. PROJECT HISTORY		500. PROJECT STATUS		501. PROJECT TYPE		502. PROJECT COST		503. PROJECT FUNDING		504. PROJECT OTHER	
505. PROJECT HISTORY		506. PROJECT STATUS		507. PROJECT TYPE		508. PROJECT COST		509. PROJECT FUNDING		510. PROJECT OTHER	
511. PROJECT HISTORY		512. PROJECT STATUS		513. PROJECT TYPE		514. PROJECT COST		515. PROJECT FUNDING		516. PROJECT OTHER	
517. PROJECT HISTORY		518. PROJECT STATUS		519. PROJECT TYPE		520. PROJECT COST		521. PROJECT FUNDING		522. PROJECT OTHER	
523. PROJECT HISTORY		524. PROJECT STATUS		525. PROJECT TYPE		526. PROJECT COST		527. PROJECT FUNDING		528. PROJECT OTHER	
529. PROJECT HISTORY		530. PROJECT STATUS		531. PROJECT TYPE		532. PROJECT COST		533. PROJECT FUNDING		534. PROJECT OTHER	
535. PROJECT HISTORY		536. PROJECT STATUS		537. PROJECT TYPE		538. PROJECT COST		539. PROJECT FUNDING		540. PROJECT OTHER	
541. PROJECT HISTORY		542. PROJECT STATUS		543. PROJECT TYPE		544. PROJECT COST		545. PROJECT FUNDING		546. PROJECT OTHER	
547. PROJECT HISTORY		548. PROJECT STATUS		549. PROJECT TYPE		550. PROJECT COST		551. PROJECT FUNDING		552. PROJECT OTHER	
553. PROJECT HISTORY		554. PROJECT STATUS		555. PROJECT TYPE		556. PROJECT COST		557. PROJECT FUNDING		558. PROJECT OTHER	
559. PROJECT HISTORY		560. PROJECT STATUS		561. PROJECT TYPE		562. PROJECT COST		563. PROJECT FUNDING		564. PROJECT OTHER	
565. PROJECT HISTORY		566. PROJECT STATUS		567. PROJECT TYPE		568. PROJECT COST		569. PROJECT FUNDING		570. PROJECT OTHER	
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577. PROJECT HISTORY		578. PROJECT STATUS		579. PROJECT TYPE		580. PROJECT COST		581. PROJECT FUNDING		582. PROJECT OTHER	
583. PROJECT HISTORY		584. PROJECT STATUS		585. PROJECT TYPE		586. PROJECT COST		587. PROJECT FUNDING		588. PROJECT OTHER	
589. PROJECT HISTORY		590. PROJECT STATUS		591. PROJECT TYPE		592. PROJECT COST		593. PROJECT FUNDING		594. PROJECT OTHER	
595. PROJECT HISTORY		596. PROJECT STATUS		597. PROJECT TYPE		598. PROJECT COST		599. PROJECT FUNDING		600. PROJECT OTHER	
601. PROJECT HISTORY		602. PROJECT STATUS		603. PROJECT TYPE		604. PROJECT COST		605. PROJECT FUNDING		606. PROJECT OTHER	
607. PROJECT HISTORY		608. PROJECT STATUS		609. PROJECT TYPE		610. PROJECT COST		611. PROJECT FUNDING		612. PROJECT OTHER	
613. PROJECT HISTORY		614. PROJECT STATUS		615. PROJECT TYPE		616. PROJECT COST		617. PROJECT FUNDING		618. PROJECT OTHER	
619. PROJECT HISTORY		620. PROJECT STATUS		621. PROJECT TYPE		622. PROJECT COST		623. PROJECT FUNDING		624. PROJECT OTHER	
625. PROJECT HISTORY		626. PROJECT STATUS		627. PROJECT TYPE		628. PROJECT COST		629. PROJECT FUNDING		630. PROJECT OTHER	
631. PROJECT HISTORY		632. PROJECT STATUS		633. PROJECT TYPE		634. PROJECT COST		635. PROJECT FUNDING		636. PROJECT OTHER	
637. PROJECT HISTORY		638. PROJECT STATUS		639. PROJECT TYPE		640. PROJECT COST		641. PROJECT FUNDING		642. PROJECT OTHER	
643. PROJECT HISTORY		644. PROJECT STATUS		645. PROJECT TYPE		646. PROJECT COST		647. PROJECT FUNDING		648. PROJECT OTHER	
649. PROJECT HISTORY		650. PROJECT STATUS		651. PROJECT TYPE		652. PROJECT COST		653. PROJECT FUNDING		654. PROJECT OTHER	
655. PROJECT HISTORY		656. PROJECT STATUS		657. PROJECT TYPE		658. PROJECT COST		659. PROJECT FUNDING		660. PROJECT OTHER	
661. PROJECT HISTORY		662. PROJECT STATUS		663. PROJECT TYPE		664. PROJECT COST		665. PROJECT FUNDING		666. PROJECT OTHER	
667. PROJECT HISTORY		668. PROJECT STATUS		669. PROJECT TYPE		670. PROJECT COST		671. PROJECT FUNDING		672. PROJECT OTHER	
673. PROJECT HISTORY		674. PROJECT STATUS		675. PROJECT TYPE		676. PROJECT COST		677. PROJECT FUNDING		678. PROJECT OTHER	
679. PROJECT HISTORY		680. PROJECT STATUS		681. PROJECT TYPE		682. PROJECT COST		683. PROJECT FUNDING		684. PROJECT OTHER	
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691. PROJECT HISTORY		692. PROJECT STATUS		693. PROJECT TYPE		694. PROJECT COST		695. PROJECT FUNDING		696. PROJECT OTHER	
697. PROJECT HISTORY		698. PROJECT STATUS		699. PROJECT TYPE		700. PROJECT COST		701. PROJECT FUNDING		702. PROJECT OTHER	
703. PROJECT HISTORY		704. PROJECT STATUS		705. PROJECT TYPE		706. PROJECT COST		707. PROJECT FUNDING		708. PROJECT OTHER	
709. PROJECT HISTORY		710. PROJECT STATUS		711. PROJECT TYPE		712. PROJECT COST		713. PROJECT FUNDING		714. PROJECT OTHER	
715. PROJECT HISTORY		716. PROJECT STATUS		717. PROJECT TYPE		718. PROJECT COST		719. PROJECT FUNDING		720. PROJECT OTHER	
721. PROJECT HISTORY		722. PROJECT STATUS		723. PROJECT TYPE		724. PROJECT COST		725. PROJECT FUNDING		726. PROJECT OTHER	
727. PROJECT HISTORY		728. PROJECT STATUS		729. PROJECT TYPE		730. PROJECT COST		731. PROJECT FUNDING		732. PROJECT OTHER	
733. PROJECT HISTORY		734. PROJECT STATUS		735. PROJECT TYPE		736. PROJECT COST		737. PROJECT FUNDING		738. PROJECT OTHER	
739. PROJECT HISTORY		740. PROJECT STATUS		741. PROJECT TYPE		742. PROJECT COST		743. PROJECT FUNDING		744. PROJECT OTHER	
745. PROJECT HISTORY		746. PROJECT STATUS		7							

For a DA Form 4283, the work request number might be used: APR9-99".

Block 17. [Item Number] The first step in the preparation to develop a DD Form 1354 is to identify the various components of the project. These are identified as 'items' and are listed numerically down the form.

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY										FORM		REV		DATE	
1. CHAIN OF TITLE (SEE INSTRUCTIONS)		2. PROPERTY MAP		3. COUNTRY CODE		4. PROPERTY NUMBER		5. TITLE		6. COUNTRY NUMBER		7. TITLE NUMBER		8. PROPERTY NUMBER	
9. CHAIN OF TITLE (SEE INSTRUCTIONS)		10. EXISTING TITLE		11. EXISTING CODE		12. EXISTING NUMBER		13. EXISTING NUMBER		14. EXISTING NUMBER		15. EXISTING NUMBER		16. EXISTING NUMBER	
17. EXISTING TITLE		18. EXISTING CODE		19. EXISTING NUMBER		20. EXISTING NUMBER		21. EXISTING NUMBER		22. EXISTING NUMBER		23. EXISTING NUMBER		24. EXISTING NUMBER	
25. EXISTING TITLE		26. EXISTING CODE		27. EXISTING NUMBER		28. EXISTING NUMBER		29. EXISTING NUMBER		30. EXISTING NUMBER		31. EXISTING NUMBER		32. EXISTING NUMBER	
33. EXISTING TITLE		34. EXISTING CODE		35. EXISTING NUMBER		36. EXISTING NUMBER		37. EXISTING NUMBER		38. EXISTING NUMBER		39. EXISTING NUMBER		40. EXISTING NUMBER	
41. EXISTING TITLE		42. EXISTING CODE		43. EXISTING NUMBER		44. EXISTING NUMBER		45. EXISTING NUMBER		46. EXISTING NUMBER		47. EXISTING NUMBER		48. EXISTING NUMBER	
49. EXISTING TITLE		50. EXISTING CODE		51. EXISTING NUMBER		52. EXISTING NUMBER		53. EXISTING NUMBER		54. EXISTING NUMBER		55. EXISTING NUMBER		56. EXISTING NUMBER	
57. EXISTING TITLE		58. EXISTING CODE		59. EXISTING NUMBER		60. EXISTING NUMBER		61. EXISTING NUMBER		62. EXISTING NUMBER		63. EXISTING NUMBER		64. EXISTING NUMBER	
65. EXISTING TITLE		66. EXISTING CODE		67. EXISTING NUMBER		68. EXISTING NUMBER		69. EXISTING NUMBER		70. EXISTING NUMBER		71. EXISTING NUMBER		72. EXISTING NUMBER	
73. EXISTING TITLE		74. EXISTING CODE		75. EXISTING NUMBER		76. EXISTING NUMBER		77. EXISTING NUMBER		78. EXISTING NUMBER		79. EXISTING NUMBER		80. EXISTING NUMBER	
81. EXISTING TITLE		82. EXISTING CODE		83. EXISTING NUMBER		84. EXISTING NUMBER		85. EXISTING NUMBER		86. EXISTING NUMBER		87. EXISTING NUMBER		88. EXISTING NUMBER	
89. EXISTING TITLE		90. EXISTING CODE		91. EXISTING NUMBER		92. EXISTING NUMBER		93. EXISTING NUMBER		94. EXISTING NUMBER		95. EXISTING NUMBER		96. EXISTING NUMBER	
97. EXISTING TITLE		98. EXISTING CODE		99. EXISTING NUMBER		100. EXISTING NUMBER		101. EXISTING NUMBER		102. EXISTING NUMBER		103. EXISTING NUMBER		104. EXISTING NUMBER	
105. EXISTING TITLE		106. EXISTING CODE		107. EXISTING NUMBER		108. EXISTING NUMBER		109. EXISTING NUMBER		110. EXISTING NUMBER		111. EXISTING NUMBER		112. EXISTING NUMBER	
113. EXISTING TITLE		114. EXISTING CODE		115. EXISTING NUMBER		116. EXISTING NUMBER		117. EXISTING NUMBER		118. EXISTING NUMBER		119. EXISTING NUMBER		120. EXISTING NUMBER	
121. EXISTING TITLE		122. EXISTING CODE		123. EXISTING NUMBER		124. EXISTING NUMBER		125. EXISTING NUMBER		126. EXISTING NUMBER		127. EXISTING NUMBER		128. EXISTING NUMBER	
129. EXISTING TITLE		130. EXISTING CODE		131. EXISTING NUMBER		132. EXISTING NUMBER		133. EXISTING NUMBER		134. EXISTING NUMBER		135. EXISTING NUMBER		136. EXISTING NUMBER	
137. EXISTING TITLE		138. EXISTING CODE		139. EXISTING NUMBER		140. EXISTING NUMBER		141. EXISTING NUMBER		142. EXISTING NUMBER		143. EXISTING NUMBER		144. EXISTING NUMBER	
145. EXISTING TITLE		146. EXISTING CODE		147. EXISTING NUMBER		148. EXISTING NUMBER		149. EXISTING NUMBER		150. EXISTING NUMBER		151. EXISTING NUMBER		152. EXISTING NUMBER	
153. EXISTING TITLE		154. EXISTING CODE		155. EXISTING NUMBER		156. EXISTING NUMBER		157. EXISTING NUMBER		158. EXISTING NUMBER		159. EXISTING NUMBER		160. EXISTING NUMBER	
161. EXISTING TITLE		162. EXISTING CODE		163. EXISTING NUMBER		164. EXISTING NUMBER		165. EXISTING NUMBER		166. EXISTING NUMBER		167. EXISTING NUMBER		168. EXISTING NUMBER	
169. EXISTING TITLE		170. EXISTING CODE		171. EXISTING NUMBER		172. EXISTING NUMBER		173. EXISTING NUMBER		174. EXISTING NUMBER		175. EXISTING NUMBER		176. EXISTING NUMBER	
177. EXISTING TITLE		178. EXISTING CODE		179. EXISTING NUMBER		180. EXISTING NUMBER		181. EXISTING NUMBER		182. EXISTING NUMBER		183. EXISTING NUMBER		184. EXISTING NUMBER	
185. EXISTING TITLE		186. EXISTING CODE		187. EXISTING NUMBER		188. EXISTING NUMBER		189. EXISTING NUMBER		190. EXISTING NUMBER		191. EXISTING NUMBER		192. EXISTING NUMBER	
193. EXISTING TITLE		194. EXISTING CODE		195. EXISTING NUMBER		196. EXISTING NUMBER		197. EXISTING NUMBER		198. EXISTING NUMBER		199. EXISTING NUMBER		200. EXISTING NUMBER	
201. EXISTING TITLE		202. EXISTING CODE		203. EXISTING NUMBER		204. EXISTING NUMBER		205. EXISTING NUMBER		206. EXISTING NUMBER		207. EXISTING NUMBER		208. EXISTING NUMBER	
209. EXISTING TITLE		210. EXISTING CODE		211. EXISTING NUMBER		212. EXISTING NUMBER		213. EXISTING NUMBER		214. EXISTING NUMBER		215. EXISTING NUMBER		216. EXISTING NUMBER	
217. EXISTING TITLE		218. EXISTING CODE		219. EXISTING NUMBER		220. EXISTING NUMBER		221. EXISTING NUMBER		222. EXISTING NUMBER		223. EXISTING NUMBER		224. EXISTING NUMBER	
225. EXISTING TITLE		226. EXISTING CODE		227. EXISTING NUMBER		228. EXISTING NUMBER		229. EXISTING NUMBER		230. EXISTING NUMBER		231. EXISTING NUMBER		232. EX	

Example: A1"

Block 18. [Category Code] As noted in the comments in Block 17 [Item Number], the first step in the development of a DD Form 1354 is to identify the various components of the project. These are the various major "capital improvements" that have been completed. They must be classified accurately in accordance with the standard Army real property classification system. This naming convention is identified in DA pamphlet 415-218, Army Category Codes. The DA pamphlet gives the category codes as well as the Description and the various units of measures. Copies of the DA pamphlet can be found on the USACE/ Installation Support Division web-site. The web address is www.cpw.army.mil. Facilities can be multi-faceted and have more than one-category codes assigned. This assignment of category codes can be confusing. It is recommended that prior to any work in completing a DD Form 1354, the construction agent meet with the receiving agency's real property officer and develop a draft category code/real property classification plan that can be used for development of the various items on the DD form 1354.

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY										DATE		TIME			
1. NAME OF DONOR (Organization)		2. ADDRESS OF DONOR		3. CITY AND STATE		4. ZIP CODE		5. NAME OF RECIPIENT		6. ADDRESS OF RECIPIENT		7. CITY AND STATE		8. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
5. NAME OF RECIPIENT (Organization)		6. ADDRESS OF RECIPIENT		7. CITY AND STATE		8. ZIP CODE		9. NAME OF RECIPIENT		10. ADDRESS OF RECIPIENT		11. CITY AND STATE		12. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
13. NAME OF DONOR		14. ADDRESS OF DONOR		15. CITY AND STATE		16. ZIP CODE		17. NAME OF RECIPIENT		18. ADDRESS OF RECIPIENT		19. CITY AND STATE		20. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
21. NAME OF DONOR		22. ADDRESS OF DONOR		23. CITY AND STATE		24. ZIP CODE		25. NAME OF RECIPIENT		26. ADDRESS OF RECIPIENT		27. CITY AND STATE		28. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
29. NAME OF DONOR		30. ADDRESS OF DONOR		31. CITY AND STATE		32. ZIP CODE		33. NAME OF RECIPIENT		34. ADDRESS OF RECIPIENT		35. CITY AND STATE		36. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
37. NAME OF DONOR		38. ADDRESS OF DONOR		39. CITY AND STATE		40. ZIP CODE		41. NAME OF RECIPIENT		42. ADDRESS OF RECIPIENT		43. CITY AND STATE		44. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
45. NAME OF DONOR		46. ADDRESS OF DONOR		47. CITY AND STATE		48. ZIP CODE		49. NAME OF RECIPIENT		50. ADDRESS OF RECIPIENT		51. CITY AND STATE		52. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
53. NAME OF DONOR		54. ADDRESS OF DONOR		55. CITY AND STATE		56. ZIP CODE		57. NAME OF RECIPIENT		58. ADDRESS OF RECIPIENT		59. CITY AND STATE		60. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
61. NAME OF DONOR		62. ADDRESS OF DONOR		63. CITY AND STATE		64. ZIP CODE		65. NAME OF RECIPIENT		66. ADDRESS OF RECIPIENT		67. CITY AND STATE		68. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
69. NAME OF DONOR		70. ADDRESS OF DONOR		71. CITY AND STATE		72. ZIP CODE		73. NAME OF RECIPIENT		74. ADDRESS OF RECIPIENT		75. CITY AND STATE		76. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
77. NAME OF DONOR		78. ADDRESS OF DONOR		79. CITY AND STATE		80. ZIP CODE		81. NAME OF RECIPIENT		82. ADDRESS OF RECIPIENT		83. CITY AND STATE		84. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
85. NAME OF DONOR		86. ADDRESS OF DONOR		87. CITY AND STATE		88. ZIP CODE		89. NAME OF RECIPIENT		90. ADDRESS OF RECIPIENT		91. CITY AND STATE		92. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	
93. NAME OF DONOR		94. ADDRESS OF DONOR		95. CITY AND STATE		96. ZIP CODE		97. NAME OF RECIPIENT		98. ADDRESS OF RECIPIENT		99. CITY AND STATE		100. ZIP CODE	
U.S. Army		1234 Main St		Washington		20540		U.S. Army		1234 Main St		Washington		20540	

Examples: A military construction project consists of childcare center facility complete with 2 storage sheds, 2 swing sets, and sidewalks. The breakout would be

Number of Units	Description
1	Child Care Center
2	Storage Sheds
2	Swings Sets
1	Sidewalks

Block 21. [Type] This will indicate the type of construction: AP@ = Permanent, AT@ = Temporary, and AS@ = Semi- permanent. For exact definitions for each category reference AR

[illegible]

405-45.

Examples: AP@

Block 22. [Unit of Measure]]

This field identifies the appropriate unit of measures for the real property. DA Pamphlet 415-28 identifies the appropriate unit of measures that the affected real property should be measured. It should be advised that many of the Army's real property classifications are measured by two unit of measures, (UM 1) and (UM 2). Preparers should provide measurements in accordance with the required UM 1 and UM 2 designation as cited in the DA Pamphlet.

when the not all the costs for the project haven't been resolved. Final costs is when the project is entirely complete. If the project is identified as Final in block 15B (as noted above), then in front of the costs for each item the letter F should be noted. Likewise if in Block 15B, the project is cited for Beneficial Occupancy or Physically Completed, the costs show be identified as preliminary and a letter P should be identified in front of each item's costs.

Many of our DD Form 1354 documents address improvements to existing facilities that have already been accounted already in the Army's real property management system IFS-M. Preparers should only record the capital costs for the improvements to the real property. This will be the costs that the receiving installation will record in the general ledger balance.

As mentioned before, all engineering, design and inspection costs will be entered on the DD Form 1354 as a separate line item.

When recording costs, the preparer needs to identify the types of funds. This is mandatory. These types of funds should include but not limit to NAF (Non-appropriated Fund), OMA (Operations and Maintenance, Army, MCA (Military Construction, Army), MCAR (Military Construction Army, Reserve), DODS (DOD Schools), etc.

Examples: The following illustration should depict the appropriate format.

Item	Cat Code	Facility No.	Type	UM	Quan Of Units	Costs
1	74014	Child Care Center	P	SF	23,600	P-\$3,182,854.00-MCA

Block 25. [Drawing Number] Indicates the number assigned to a particular drawing of a construction project as it relates to the different components to a facility. The architectural drawing would be number one, the plumbing would be number two, etc. Using the old manual system the drawing numbers would relate to each page of the project. However, now that the automated system of >Computer Assisted Drafting/Design= (CADD) system is operational at

many installations this is not the case. If possible there should be a drawing(s) for each category code.

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY											
1. PROJECT NUMBER		2. PROJECT NAME		3. PROJECT LOCATION		4. PROJECT TYPE		5. PROJECT STATUS		6. PROJECT DATE	
7. PROJECT DESCRIPTION		8. PROJECT PURPOSE		9. PROJECT SCOPE		10. PROJECT BUDGET		11. PROJECT COST		12. PROJECT RESULTS	
13. PROJECT CODE	14. PROJECT CATEGORY	15. PROJECT SUBCATEGORY	16. PROJECT UNIT	17. PROJECT QUANTITY	18. PROJECT UNIT PRICE	19. PROJECT TOTAL PRICE	20. PROJECT TOTAL COST	21. PROJECT TOTAL BUDGET	22. PROJECT TOTAL RESULTS	23. PROJECT TOTAL STATUS	24. PROJECT TOTAL DATE
<div style="display: flex; justify-content: space-between;"> <div> <p>25. PROJECT COMMENTS</p> <p>26. PROJECT REMARKS</p> <p>27. PROJECT SIGNATURE</p> <p>28. PROJECT DATE</p> </div> <div> <p>29. PROJECT UNIT PRICE</p> <p>30. PROJECT TOTAL PRICE</p> <p>31. PROJECT TOTAL COST</p> <p>32. PROJECT TOTAL BUDGET</p> <p>33. PROJECT TOTAL RESULTS</p> <p>34. PROJECT TOTAL STATUS</p> <p>35. PROJECT TOTAL DATE</p> </div> </div>											

DD 1354

Examples: AF-740-13-11"
AR-342-13-12"

Block 26. [Remarks] Self-explanatory. This field may be used to note any information about the drawing numbers, project number, or reason for the DD Form 1354 (change in unit of measure, reason for increase/decrease in cost, type of cost, etc).

TRANSFER AND ACCEPTANCE OF MILITARY REAL PROPERTY											
1. PROJECT NUMBER		2. PROJECT NAME		3. PROJECT LOCATION		4. PROJECT TYPE		5. PROJECT STATUS		6. PROJECT DATE	
7. PROJECT DESCRIPTION		8. PROJECT PURPOSE		9. PROJECT SCOPE		10. PROJECT BUDGET		11. PROJECT COST		12. PROJECT RESULTS	
13. PROJECT CODE	14. PROJECT CATEGORY	15. PROJECT SUBCATEGORY	16. PROJECT UNIT	17. PROJECT QUANTITY	18. PROJECT UNIT PRICE	19. PROJECT TOTAL PRICE	20. PROJECT TOTAL COST	21. PROJECT TOTAL BUDGET	22. PROJECT TOTAL RESULTS	23. PROJECT TOTAL STATUS	24. PROJECT TOTAL DATE
<div style="display: flex; justify-content: space-between;"> <div> <p>25. PROJECT COMMENTS</p> <p>26. PROJECT REMARKS</p> <p>27. PROJECT SIGNATURE</p> <p>28. PROJECT DATE</p> </div> <div> <p>29. PROJECT UNIT PRICE</p> <p>30. PROJECT TOTAL PRICE</p> <p>31. PROJECT TOTAL COST</p> <p>32. PROJECT TOTAL BUDGET</p> <p>33. PROJECT TOTAL RESULTS</p> <p>34. PROJECT TOTAL STATUS</p> <p>35. PROJECT TOTAL DATE</p> </div> </div>											

DD 1354

Examples: ADry Pipe Sprinkler System@
ARemove bituminous parking lot@

Block 27. [Statement of Completion] Indicates the signature/title of the individual responsible for the transfer of the facility/equipment. This is normally accomplished by the Project Manager whether for the Corps District or for the DPW. The date is self explanatory, however, the date must be prior to, or the same as, the date of acceptance in item 28 on the DD Form 1354. The date is placed in at the time of signature.

Example: Transferred by (signature): AJohn D. Jones@
 Title: AChief, Engineering Plans and Services Div.@
 Date: A19 Jan 1999"

Block 28. [Accepted By] Indicates the signature/title of the individual responsible for accepting

the transfer of such properties. The date is placed in at time of signature.

Example: Accepted by: AMark G. Pine, Maj, US Army@
 Title: @Director of Public Works, Fort Drum@
 Date: A33 Mar 1999"

Block 29. [Property Voucher Number] The preparer of the document should leave this field blank. The receiving installation Real Property Officer will fill this in when the DD Form 1354 information is recorded in the installation General Ledger voucher. This number will be assigned sequentially by the DPW Real Property office to indicate the voucher occurrence that the transaction was accepted/vouchered. For additional information concerning Voucher Register and File, reference DA PAM 405-45, =Real Property Inventory Management=.

Example: AV123-99", This indicates that this is the 123rd voucher for FY 99.

NOTE: Blocks 30 and 31 reside on the back of DD Form 1354. A blank DD Form 1354 is located at the end of this chapter.

Block 30. [Construction Deficiencies] This should indicate any deficiencies of the design or construction of the project.

Examples: ARestore all grassed areas disturbed by construction@
 AReplace/ repair iron rod fence that was damaged during construction@

Block 31. [Remarks] Self-explanatory. If the AOther@ box is checked in item 15 an explanation is mandatory in the ARemarks@ column.

Examples: ATransfer of installation From MACOM X to MACOM X.@
 APartial demolition of Facility 78921@

Upon receiving information on a signed DD Form 1354 the Real Property office will enter the information in the appropriate fields/screens in the automated Real Property system. The voucher register will be updated with the information and the DD Form 1354 filed in the permanent Real Property records. A blank DD Form 1354 (front and back) is located on the following pages.

DD 1354

CONSTRUCTION DEFICIENCIES.

31. REMARKS

INSTRUCTIONS

This form has been designed and issued for use in connection with the transfer of military real property between the military departments and to or from government agencies. It supersedes ENG Forms 290 and 290B (*formerly used by the Army and Air Force*) and NAVDOCKS Form 2317 (*formerly used by the Navy*).

Existing instructions issued by the military departments relative to the preparation of the three superseded forms are applicable to this form to the extent that the various items and

columns on the superseded forms have been retained. Additional instructions, as appropriate, will be promulgated by the military departments in connection with any new items appearing hereon.

With the issuance of this DD form, it is not intended that the departments shall revise and reprint manuals and directives simply to show the number of this DD form. Such action can be accomplished through the normal course of revision for other reasons.

GPO 821-265